Exercise-1

✍ **Marked Questions may have for Revision Questions.**

ONLY ONE OPTION CORRECT TYPE

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

1. The halogens are :
(1) transition elements (2) inner-transition elements
(3) noble elements (4) representative elements

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.

3.✍ The order of negative electron gain enthalpy of halogens is :
(1) F > Cl > Br > I (2) Cl > Br > F > I (3) Cl > F > Br > I (4) I > Br > Cl > F

4. The halogen-halogen bond length is longest for :
(1) fluorine (2) chlorine (3) bromine (4) iodine

5. Which statement is correct about halogens ?
(1) They are all diatomic and form univalent ions
(2) They are all capable of exhibiting several oxidation states
(3) They are all diatomic and form divalent ions
(4) They can mutually displace each other from the solution of their compounds with metals.

6. Oxidising action increases in the following order :
(1) Cl < Br < I < F (2) Cl < I < Br < F (3) I < F < Cl < Br (4) I < Br < Cl < F

7. Which of the following hydrogen halides is most volatile ?
(1) HCl (2) HF (3) HI (4) HBr

8. The strongest reducing agent is :
(1) F^- (2) Cl^- (3) Br^- (4) I^-

9✍ The common positive oxidation states exhibited by the halogens are
(1) +2, +4, +6 (2) –1, +1, +3, +5 (3) +1, +2, +3 (4) +1 to +7

10. Fluorine does not show positive oxidation states due to the absence of :
(1) d-orbitals (2) s-orbitals (3) p-orbitals (4) none

11. Fluorine is a stronger oxidising agent than chlorine in aqueous solution. This is attributed to many factors except :
(1) heat of dissociation (2) electron affinity
(3) ionization potential (4) heat of hydration

12. Which one of the following is most basic ?
(1) F^- (2) Cl^- (3) Br^- (4) I^-

13✍ Which of the following is not the characteristic of interhalogen compounds ?
(1) They are more reactive than halogens
(2) They are quite unstable but none of them is explosive
(3) They are covalent in nature
(4) They have low boiling points and are highly volatile

14. Which of the following has highest bond strength :
(1) HI (2) HCl (3) HF (4) HBr

Section (B) : Halogens and their Compounds

1. Which of the following reactions does not give chlorine as one of the products ?
(1) $KMnO_4$ (s) + HCl (2) HCl (g) + O_2 (g) + $CuCl_2$(s) 723 K
(3) NaCl (s) + $K_2Cr_2O_7$ (s) + H_2SO_4 (4) NaCl (s) + MnO_2(s) + H_2SO_4

2. The correct chemical composition of bleaching powder is :
(1) $Ca(OCl)_2CaCl_2$ (2) $Ca(OCl)_2.CaCl_2.Ca(OH)_2.2H_2O$
(3) $Ca(OCl)_2.2H_2O$ (4) None

3. HCl gas is dried by passing through :
(1) Na_2SO_3 (2) Concentrated H_2SO_4
(3) Na_2CO_3 (4) Ammonia solution

4. Chlorine gas is dried over :
(1) CaO (2) NaOH (3) H_2SO_4 (4) NH_3 (ℓ)

5. Bleaching powder is obtained by the interaction of chlorine and :
(1) dilute solution of $Ca(OH)_2$ (2) concentrated solution of $Ca(OH)_2$
(3) dry calcium oxide (4) dry slaked lime

6. When cold NaOH reacts with Cl_2 which of the following is formed ?
(1) NaClO (2) $NaClO_2$ (3) $NaClO_3$ (4) $NaClO_4$

7. ClO_2 is the anhydride of :
(1) HOCl (2) $HClO_2$ (3) $HClO_3$ (4) $HClO_2$ & $HClO_3$

8. The following acids have been arranged in the order of decreasing acid strength. Identify the correct order. ClOH(I) BrOH(II) IOH (III) :
(1) I > II > III (2) II > I > III (3) III > II > I (4) I > III > II

9. A greenish yellow gas reacts with an alkali metal hydroxide to form a halate which can be used in fire works and safety matches. The gas and halate respectively are :
(1) Br_2, $KBrO_3$ (2) Cl_2, $KClO_3$ (3) I_2, $NaIO_3$ (4) None

10. Chlorine acts as a bleaching agent only in presence of :
(1) dry air (2) moisture (3) sunlight (4) pure oxygen

11. Which can do glass etching ?
(1) HIO_4 (2) HF (3) HNO_3 (4) SIF_4

12. ClO_3 is the mixed anhydride of :
(1) $HClO_2$ and $HClO_3$ (2) $HClO_3$ and $HClO_4$ (3) $HClO_2$ and $HClO_4$ (4) $HClO_2$ and $HClO_3$

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

1. The formation of O_2^+ $[PtF_6]^-$ is the basis for the formation of xenon fluorides. This is because :
(1) O_2 and Xe have comparable sizes.
(2) both O_2 and Xe are gases.
(3) O_2 and Xe have comparable ionisation energies.
(4) O_2 and Xe have comparable electronegativities.

2. Of the following species, one which is non-existent :
(1) XeF_6 (2) XeF_5 (3) XeF_4 (4) XeF_2

3 Among noble gases (from He to Xe) only xenon reacts with fluorine to form stable fluorides because xenon :
(1) has the largest size. (2) has the lowest ionization enthalpy.
(3) has the highest heat of vaporization. (4) is the most readily available noble gas.

4. Which of the noble gas has highest polarizability ?
(1) He (2) Ar (3) Kr (4) Xe

Section (D) : Noble gases and their Compounds

1. The element which has not yet been reacted with F_2 is :
(1) Ar (2) Xe (3) Kr (4) Rn

2 XeF_4 on partial hydrolysis produces :
(1) XeF_2 (2) $XeOF_2$ (3) $XeOF_4$ (4) XeO_3

3 XeF_6 on complete hydrolysis gives :
(1) Xe (2) XeO_2 (3) XeO_3 (4) XeO_4

4. Helium is added to oxygen used by deep sea divers because :
(1) It is less soluble in blood than nitrogen under high pressure
(2) It is lighter than nitrogen
(3) It is readily miscible with oxygen
(4) It is less poisonous than nitrogen

5. The coloured discharge tubes for a advertisement mainly contain :
(1) xenon (2) helium (3) neon (4) argon

6. XeF_2 reacts with PF_5 to give :
(1) XeF_6 (2) $[XeF]^+ [PF_6]^-$ (3) XeF_4 (4) $[PF_4]^+ [XeF_3]^-$

Exercise-2

Marked Questions may have for Revision Questions.

1. Which of the following is weakest oxidising agent ?
(1) F_2 (2) Cl_2 (3) Br_2 (4) I_2

2. Which of the following is not oxidised by MnO_2 ?
(1) F^- (2) Cl^- (3) Br^- (4) I^-

3. In the preparation of HBr or HI , NaX (X = Br, I) is treated with H_3PO_4 and not by concentrated H_2SO_4 since,
(1) H_2SO_4 makes the reaction reversible
(2) H_2SO_4 oxidises HX to X_2 (Br_2 , I_2)
(3) Na_2SO_4 is water soluble and Na_3PO_4 is water insoluble
(4) Na_3PO_4 is water insoluble and Na_2SO_4 is water soluble

4. The strongest acid amongst the following is :

(1) $HClO_4$ (2) $HClO_3$ (3) $HClO_2$ (4) HClO

5. The isoelectronic pair is :
(1) Cl_2O, ICl_2^- (2) ICl_2^-, ClO_2 (3) IF_2^+, I_3^- (4) ClO_2^-, ClF_2^+

6. Which of the following orders is not correct with respect to the property indicated against each ?
(1) F < Cl < Br < I ⟶ covalent radius
(2) $F^- > Cl^- > Br > I^-$ ⟶ enthalpy of hydration
(3) $F_2 > Cl_2 > Br_2 > I_2$ ⟶ bond dissociation enthalpy
(4) $F_2 < Cl_2 < Br_2 < I_2$ ⟶ X–X bond length (pm)

7. Which of the following reactions is not correctly matched with the products actually obtained in the reaction?
(1) $Cl_2(g) + H_2O(\ell) \longrightarrow HCl(aq) + HOCl(aq)$
(2) $2Br_2(g) + 2H_2O(\ell) \longrightarrow 4HBr(aq) + O_2(s)$
(3) $4I^-(aq) + 4H^+(aq) + O_2(g) \longrightarrow 2I_2(s) + 2H_2O(\ell)$
(4) $2F_2(g) + 2H_2O(\ell) \longrightarrow 4H^+(aq) + 4F^-(aq) + O_2(g)$

8. Hydrolysis of XX'_5 yields : (X′ is smaller halogen and X is bigger halogen) :
(1) HX′ and HOX (2) HX′ and HXO_3 (3) HX' and HXO_4 (4) HX and $HX'O_3$

9. Consider following properties of the noble gases.
I : They readily form compounds which are colourless.
II : They generally do not form ionic compounds.
III : Xenon has variable oxidation states in its compounds.
IV : the smaller He and Ne do not form clathrate compounds.
Select correct properties.
(1) I, II , III (2) II , III, IV (3) I, III, IV (4) All

10. Which one of the following configuration represents a noble gas ?
(1) $1s^2\ 2s^2\ p^6,\ 3s^2$ (2) $1s^2\ 2s^2\ p^6,\ 3s^1$ (3) $1s^2\ 2s^2\ p^6$ (4) $1s^2\ 2s^2\ p^6,\ 3s^2\ p^6,\ 4s^2$

11. In Kroll and I.C.I process of the production of titanium, the inert gas used is :
(1) Ne (2) Ar (3) Kr (4) Xe

12. The product of the reaction between one mole of XeO_3 and two mole of XeF_6 is :
(1) XeO_2F_2 (2) $XeOF_4$ (3) XeO_3F_2 (4) XeO_4

13. $[HXeO_4]^- + OH^- \longrightarrow [X] + [Y] + O_2 + H_2O$
The products [X] and [Y] in unbalanced reaction are :
(1) $[XeO_6]^{4-}$ & Xe (2) $[XeO_6]^{4-}$ & XeO_3 (3) XeO_3 & Xe (4) H_2XeO_4 & Xe

Exercise-3

PART - I : NEET / AIPMT QUESTION (PREVIOUS YEARS)

1. Which of the following is planar ? **[AIPMT 2000]**
(1) XeO_4 (2) XeO_3F (3) XeO_2F_2 (4) XeF_4

2. Which of the following is not true ? **[AIPMT 2003]**
(1) Among halide ions, iodide ion is the most powerful reducing agent
(2) Fluorine is the only halogen which does not show a variable oxidation state
(3) HOCl is a stronger acid than HOBr
(4) HF is a stronger acid than HCl

3. In BrF_3 molecule, the lone pairs occupy equatorial positions to minimise **[AIPMT 2004]**
(1) lone pair-bond pair repulsions only
(2) bond pair-bond pair repulsion only
(3) lone pair-lone pair and lone pair-bond pair repulsons
(4) lone pair-lone pair repulsions only

4. Among the following, the pair in which the two species are not isostructural is : **[AIPMT 2004]**
(1) SiF_4 and SF_4 (2) IO_3^- and XeO_3 (3) BH_4^- and NH_4^+ (4) PF_6^- and SF_6

5. Which one of the following arrangements represents the correct order of electron gain enthalpy (with negative sign) of the given atomic species ? **[AIPMT 2005]**
(1) F < Cl < O < S (2) S < O < Cl < F (3) O < S < F < Cl (4) Cl < F < S < O

6. Which inert gas has abnormal behaviour on liquefaction ? **[AIPMT 2006]**
(1) Xe (2) He (3) Ar (4) Kr

7. In which of the following molecules, are all the bonds not equal ? **[AIPMT 2006]**
(1) NF_3 (2) ClF_3 (3) BF_3 (4) AlF_3

8. Which of the following orders is not in accordance with the property stated against it ? **[AIPMT 2006]**
(1) $F_2 > Cl_2 > Br_2 > I_2$; bond dissociation energy (2) $F_2 > Cl_2 > Br_2 > I_2$; oxidising power
(3) HI > HBr > HCl > HF; acidic property in water (4) $F_2 > Cl_2 > Br_2 > I_2$; electronegativity

9. Which of the statements given below is incorrect ? **[AIPMT-2-2015]**
(1) Cl_2O_7 is an anhydride of perchloric acid (2) O_3 molecule is bent
(3) ONF is isoelectronic with O_2N^- (4) OF_2 is an oxide of fluorine

10. The variation of the boiling point of the hydrogen halides is in the order HF > HI > HBr > HCl.
What explains the higher boiling point of hydrogen fluoride ? **[AIPMT-2-2015]**
(1) The electronegativity of fluorine is much higher than for other elements in the group.
(2) There is strong hydrogen bonding between HF molecules
(3) The bond energy of HF molecules is greater than in other hydrogen halides.
(4) The effect of nuclear shielding is much reduced in fluorine which polarises the HF molecule.

11. Among the following, the **correct** order of acidity is : **[NEET-2016]**
(1) $HClO_4 < HClO_2 < HClO < HClO_3$ (2) $HClO_3 < HClO_4 < HClO_2 < HClO$
(3) $HClO < HClO_2 < HClO_3 < HClO_4$ (4) $HClO_2 < HClO < HClO_3 < HClO_4$

12. Match the interhalogen compounds of Column I with the geometry in column II and Assign the correct code. **[NEET-2017]**

	Column I		**Column II**
(a)	XX'	(i)	T-shape
(b)	XX_3'	(ii)	Pentagonal bipyramidal
(c)	XX_5'	(iii)	Linear
(d)	XX_7'	(iv)	Square-pyramidal
		(v)	Tetrahedral

Code :

	(a)	(b)	(c)	(d)		(a)	(b)	(c)	(d)
(1)	(iii)	(iv)	(i)	(ii)	(2)	(iii)	(i)	(iv)	(ii)

(3) (v) (iv) (iii) (ii) (4) (iv) (iii) (ii) (i)

13. Which of the following statements is not true for halogens ? **[NEET-2018]**
(1) All form monobasic oxyacids
(2) Chlorine has the highest electron gain enthalpy
(3) All but fluorine show positive oxidation states
(4) All are oxidizing agents

PART - II : AIIMS QUESTION (PREVIOUS YEARS)

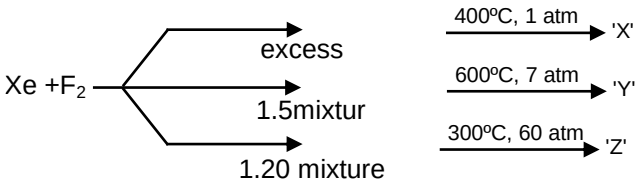
1. Among the following molecules, **[AIIMS 2005]**
(i) XeO_3 (ii) $XeOF_4$ (iii) XeF_6
those having same number of lone pairs on Xe are
(1) (i) and (ii) only (2) (i) and (iii) only (3) (ii) and (iii) only (4) (i), (ii) and (iii)

2. Which two of the following salts are used for preparing iodized salt ? **[AIIMS 2006]**
(i) KIO_3, (ii) KI, (iii) I_2, (iv) HI
(1) (i) and (ii) (2) (i) and (iii) (3) (ii) and (iv) (4) (iii) and (iv)

3. The order of solubility of lithium halides in non-polar solvents follows the order : **[AIIMS 2013]**
(1) LiI > LiBr > LiCl > LiF (2) LiF > LiI > LiBr > LiCl
(3) LiCl > LiF > LiI > LiBr (4) LiBr > LiCl > LiF > LiI

4. **Assertion :** HOF bond angle in HFO is higher than HOCl bond angle in HClO. **[AIIMS 2014]**
Reason : Oxygen is more electronegative than halogens.
(1) If both assertion and reason are true and reason is a correct explanation of assertion.
(2) If both assertion and reason are true but reason is not a correct explanation of assertion.
(3) If assertion is true but reason is false.
(4) If assertion and reason both are false.

5. Consider the following reaction **[AIIMS 2017]**



Here, X, Y and Z respectively, are
(1) XeF_2, XeF_6, XeF_4 (2) XeF_2, XeF_4, XeF_6
(3) XeF_4, XeF_2, XeF_6 (4) XeF_6, XeF_4, XeF_2

6. Which of the following cantain at least one lone pair in all of its halide **[AIIMS 2018]**
(1) Xe (2) Se (3) Cl (4) N

7. ClF_2^- , ClF_4^- find out number of lone pair and geometry. **[AIIMS 2018]**
(1) 3 – Linear, 2 – Square planar (2) 3 – Square planar, 2 – Linear
(3) 0 – Linear, 3 – Square planar (4) 2 – Linear, 2 – Square planar

8. **Assertion :** F_2 and Cl_2 when passed through water, F_2 is more reactive. **[AIIMS 2018]**

Reason : F_2 is most electronegative.

(1) If both assertion and reason are true and reason is the correct explanation of assertion.

(2) If both assertion and reason are true but reason is not the correct explanation of assertion.

(3) If assertion is true but reason is false.

(4) If both assertion and reason are false.

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

1. In case of nitrogen, NCl_3 is possible but no NCl_5 while in case of phosphorus, PCl_3 as well as PCl_5 are possible. It is due to : **[AIEEE 2002]**

(1) availability of vacant d-orbital in P but not in N.

(2) lower electronegativity of P then N.

(3) lower tendency of H bond formation in P than N.

(4) occurrence of P in solid while N in gaseous state at room temperature.

2. Concentrated hydrochloric acid when kept in open air sometimes produces a cloud of white fumes. This is due to : **[AIEEE 2003]**

(1) strong affinity of HCl gas for moisture in air results in forming of droplets of liquid solution which appears like a cloudy smoke.

(2) strong affinity for water, conc. HCl pulls moisture of air towards self. The moisture forms droplets of water and hence the cloud.

(3) conc. HCl emits strongly smelling HCl gas all the time.

(4) oxygen in air reacts with emitted HCl gas to form a cloud of chlorine gas.

3. The substance used in holmes singnals of the ship is a mixture of : **[AIEEE 2003]**

(1) $CaC_2 + Ca_3P_2$ (2) $Ca_3(PO_4)_2 + Pb_3O_4$ (3) $H_3PO_4 + CaCl_2$ (4) $NH_3 + HOCl$

4. Which one of the following statements regarding helium is incorrect ? **[AIEEE 2004]**

(1) It is used to produce and sustain powerful superconducting magnets

(2) It is used as a cryogenic agent for carrying out experiments at low temperatures

(3) It is used to fill gas balloons instead of hydrogen because it is lighter and non-inflammable

(4) It is used in gas-cooled nuclear reactors

5. Which among the following factors is the most important in making fluorine the strongest oxidizing halogen? **[AIEEE-2004]**

(1) Hydration enthalpy (2) Ionization enthalpy (3) Electron affinity (4) Bond dissociation energy

6. The correct order of the thermal stability of hydrogen halides (H – X) is : **[AIEEE 2005]**

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

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

7. Which of the following statements is true? **[AIEEE 2006]**

(1) H_3PO_3 is a stronger acid than H_2SO_3 (2) In aqueous medium HF is a stronger acid than HCl

(3) $HClO_4$ is a weaker acid than $HClO_3$ (4) HNO_3 is a stronger acid than HNO_2

8. What products are expected from the disproportionation reaction of hypochlorous acid? **[AIEEE 2006]**

(1) $HClO_3$ and Cl_2O (2) $HClO_2$ and $HClO_4$ (3) HCl and Cl_2O (4) HCl and $HClO_3$

9. Identify the incorrect statement among the following. **[AIEEE 2007, 3/120]**

(1) Cl_2 reacts with excess of NH_3 to give N_2 and NH_4Cl.

(2) Br_2 reacts with hot and strong NaOH solution to give NaBr, $NaBrO_4$ and H_2O.

(3) Ozone reacts with SO_2 to given SO_3.

(4) Silicon reacts with $NaOH_{(aq)}$ in the presence of air to give Na_2SiO_3 and H_2O.

10 Which one of the following reactions of Xenon compounds is not feasible ? **[AIEEE 2009, 4/144]**

(1) $3XeF_4 + 6H_2O \rightarrow 2Xe + XeO_3 + 12HF + 1.5O_2$

(2) $2XeF_2 + 2H_2O \rightarrow 2Xe + 4HF + O_2$

(3) $XeF_6 + RbF \rightarrow Rb[XeF_7]$

(4) $XeO_3 + 6HF \rightarrow XeF_6 + 3H_2O$

11. Which among the following is the most reactive ? **[JEE-Main 2015]**

(1) Cl_2 (2) Br_2 (3) I_2 (4) ICl

12. The products obtained when chlorine gas reacts with cold and dilute aqueous NaOH are : **[JEE-Main 2017]**

(1) ClO_2^- and ClO_3^- (2) Cl^- and ClO^- (3) Cl^- and ClO_2^- (4) ClO^- and ClO_3^-

13. Chlorine on reaction with hot and concentrated sodium hydroxide gives: **[JEE-Main 2019]**

(1) ClO_3^- and ClO_2^- (2) Cl^- and ClO^- (3) Cl^- and ClO_3^- (4) Cl^- and ClO_2^-

Answers

EXERCISE - 1

SECTION (A)

1.	(4)	**2.**	(2)	**3.**	(3)	**4.**	(4)	**5.**	(1)	**6.**	(4)	**7.**	(1)
8.	(4)	**9**	(2)	**10.**	(1)	**11.**	(3)	**12.**	(4)	**13**	(4)	**14.**	(3)

SECTION (B)

1	(3)	**2**	(2)	**3.**	(2)	**4.**	(3)	**5.**	(4)	**6.**	(1)	**7.**	(4)
8.	(1)	**9**	(2)	**10.**	(2)	**11.**	(2)	**12**	(2)				

SECTION (C)

1	(3)	**2.**	(2)	**3**	(2)	**4.**	(4)

SECTION (D)

1.	(1)	**2**	(2)	**3**	(3)	**4.**	(1)	**5.**	(3)	**6.**	(2)

EXERCISE - 2

1.	(4)	**2.**	(1)	**3.**	(2)	**4.**	(1)	**5.**	(4)	**6.**	(3)	**7.**	(2)
8.	(2)	**9.**	(2)	**10.**	(3)	**11.**	(2)	**12.**	(2)	**13.**	(1)		

EXERCISE - 3

PART-I

1.	(4)	**2.**	(4)	**3.**	(3)	**4.**	(1)	**5.**	(3)	**6.**	(2)	**7.**	(2)
8.	(1)	**9.**	(4)	**10.**	(2)	**11.**	(3)	**12.**	(2)	**13.**	(1)		

PART-II

1.	(4)	**2.**	(1)	**3.**	(1)	**4.**	(4)	**5.**	(2)	**6.**	(1)	**7.**	(1)
8.	(2)												

PART-III

1.	(1)	**2.**	(4)	**3.**	(1)	**4.**	(3)	**5.**	(4)	**6.**	(2)	**7.**	(4)
8.	(4)	**9.**	(2)	**10**	(4)	**11.**	(4)	**12.**	(2)	**13.**	(3)		