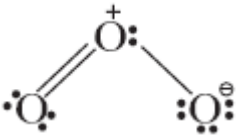


1 Despite lower value of its electron gain enthalpy with negative sign, fluorine (F_2) is a stronger oxidising agent than Cl_2 . 1

ANS: It is due to higher standard reduction potential of F_2 which is due to low bond dissociation energy of $F-F$ bond due to inter electronic repulsion among small size F atoms, high electron gain enthalpy and highest hydration enthalpy.

2 Draw the structure of O_3 molecule. 1

ANS:  It is bent molecule.

3 Write one chemical reaction equation to show that SO_2 acts as a reducing agent. 1

ANS: $2H_2S(g) + SO_2(g) \xrightarrow[673\text{ K}]{Fe_2O_3 \text{ catalyst}} 2H_2O(g) + 3S(s)$

4 Write one chemical reaction equation to show that conc. H_2SO_4 is a strong oxidising agent. 1

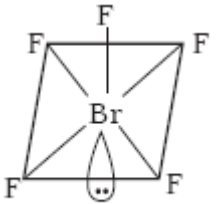
ANS: $C + 2H_2SO_4(\text{conc.}) \rightarrow CO_2 + 2H_2O + 2SO_2$

5 Complete the following reaction: 1

$Xe + PtF_6 \rightarrow$

ANS: $Xe + PtF_6 \rightarrow Xe^+[PtF_6]^-$

6 Draw the structure of BrF_5 . 1

ANS:  Square pyramidal

7 Noble gases have very low boiling points. Why? 1

ANS: It is due to weak van der Waals' forces of attraction because they are nonpolar.

8 Does the hydrolysis of XeF_6 lead to a redox reaction? 1

ANS: No, the products of hydrolysis are $XeOF_4$, XeO_2F_2 and XeO_3 where the oxidation states of all the elements remain the same as it was in the reacting state, therefore, it is not a redox reaction.

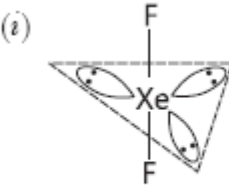
9 Fluorine exhibits only -1 oxidation state whereas other halogens exhibit $+1$, $+3$, $+5$, and $+7$ oxidation states also. Explain. 2

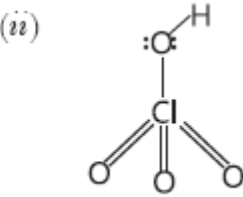
ANS: 'F' is the smallest in size and most electronegative element and does not have d-orbitals, therefore, it shows -1 oxidation only. It cannot show higher oxidation states due to absence of d-orbitals, whereas other halogens show $+1$, $+3$, $+5$, $+7$ oxidation states along with -1 .

10 Draw the structures of the following molecules: 2

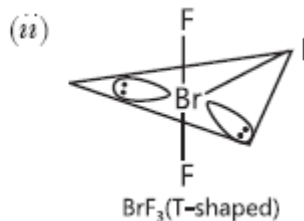
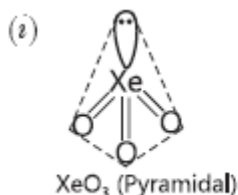
(i) XeF_2

(ii) $HClO_4$

ANS: (i)  (XeF₂) Linear

(ii)  HClO₄ (Perchloric acid)

- 11 Draw the structure and predict the shape of
 (i) XeO₃ and
 (ii) BrF₃ 2



ANS:

- 12 How would you account for the following:
 (i) Enthalpy of dissociation for F₂ is much less than that for Cl₂. 2
 (ii) Sulphur in vapour state exhibits paramagnetism.

ANS: (i) It is because interelectronic repulsion between valence electrons of F is more than Cl due to smaller size.

(ii) It is due to presence of unpaired electron in sulphur like O₂.

- 13 Assign a reason for each of the following statements:
 (i) Perchloric acid is a stronger acid than sulphuric acid. 2
 (ii) Of all the noble gases, only xenon is known to form established chemical compounds.

ANS: (i) In HClO₄, 'Cl' is more electronegative than 'S' in H₂SO₄. Secondly, Cl shows +7 oxidation state, whereas 'S' is in +6 oxidation state.

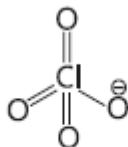
(ii) Xe has larger size and high polarizing power and low ionisation enthalpy.

- 14 Assign a reason for each of the following statements:
 (i) SF₆ is not easily hydrolysed. 2
 (ii) Hydrogen fluoride has a much higher boiling point than hydrogen chloride.

ANS: (i) It is because SF₆ is stable and inert.

(ii) HF is associated with intermolecular H-bonding, whereas HCl is not.

- 15 (i) Draw the structure of the species : ClO₄⁻ 2
 (ii) Give reasons: Xenon does not form fluorides, such as XeF₃ and XeF₅.

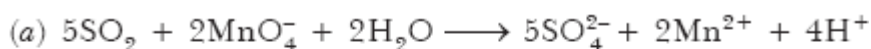


ANS: (i) Tetrahedral, sp³ hybridised (ii) [Xe(54)] has outer electronic configuration 6s²6p⁶



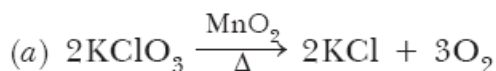
On excitation, Xe will have unpaired electron in even numbers and not in odd, therefore, it shows +2, +4, +6 oxidation states and not +1, +3, +5. Hence XeF₃ and XeF₅ do not exist.

- 16 Complete the following equations:
 (a) SO₂ + MnO₄⁻ + H₂O → (b) F₂ + H₂O (l) → 2



ANS: (b) 2F₂ + 2H₂O → 4H⁺(aq) + 4F⁻(aq) + O₂.

- 17 Complete the following equations:
 (a) KClO₃ $\xrightarrow{\text{heat}}$ (b) XeF₄ + H₂O → 2



ANS: (b) 6XeF₄ + 12H₂O → 4Xe + 2XeO₃ + 24HF + 3O₂

- 18 Assign an appropriate reason for each of the following statements:
 (i) More metal fluorides are ionic in nature than metal chlorides. 2
 (ii) SCl_6 is not known but SF_6 is known.
- ANS: (i) It is due to greater difference in electronegativity in fluorides than in chlorides.
 (ii) In SCl_6 , there is more repulsion than in SF_6 , therefore, SCl_6 does not exist.
- 19 Complete the following reaction equation:
 (i) $\text{XeF}_2(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow$ 2
 (ii) $\text{NaOH}(\text{cold \& dilute}) + \text{Cl}_2 \rightarrow$
- (i)
$$\text{XeF}_2 + \text{H}_2\text{O} \longrightarrow \text{Xe} + 2\text{HF} + \frac{1}{2}\text{O}_2$$
- (ii)
$$2\text{NaOH} + \text{Cl}_2 \longrightarrow \text{NaCl} + \text{NaClO} + \text{H}_2\text{O}$$
- ANS: (cold & dil)
- 20 Complete the following reaction equation:
 (i) $\text{XeF}_4 + \text{H}_2\text{O} \rightarrow$ 2
 (ii) $\text{Fe}^{3+} + \text{SO}_2 + \text{H}_2\text{O} \rightarrow$
- (i)
$$6\text{XeF}_4 + 12\text{H}_2\text{O} \longrightarrow 4\text{Xe} + 2\text{XeO}_3 + 24\text{HF} + 3\text{O}_2$$
- ANS: (ii)
$$2\text{Fe}^{3+} + \text{SO}_2 + 2\text{H}_2\text{O} \longrightarrow 2\text{Fe}^{2+} + \text{SO}_4^{2-} + 4\text{H}^+$$
- 21 How would you account for the following:
 (i) Sulphur hexafluoride is less reactive than sulphur tetrafluoride. 2
 (ii) Of the noble gases only xenon forms known chemical compounds.
- ANS: (i) It is due to less repulsion in SF_6 as compared to SF_4 .
 (ii) It is due to large atomic size and high polarizing power and low ionisation enthalpy of Xenon.
- 22 Arrange the following in the order of property indicated against each set:
 (i) HF, HCl, HBr, HI – increasing bond dissociation enthalpy. 2
 (ii) H_2O , H_2S , H_2Se , H_2Te – increasing acidic character.
- ANS: (i) $\text{HI} < \text{HBr} < \text{HCl} < \text{HF}$ is the increasing order of bond dissociation enthalpy.
 (ii) $\text{H}_2\text{O} < \text{H}_2\text{S} < \text{H}_2\text{Se} < \text{H}_2\text{Te}$ is the increasing order of acidic character.
- 23 What happens when:
 (i) Concentrated H_2SO_4 is added to calcium fluoride; 2
 (ii) SO_3 is passed through water?
- ANS: (i) $\text{CaF}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + 2\text{HF}$, Hydrogen fluoride is formed.
 (ii) $\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$, Sulphuric acid is formed.
- 24 Explain the following giving an appropriate reason in each case.
 (i) O_2 and F_2 both stabilize higher oxidation states of metals but O_2 exceeds F_2 in doing so. 2
 (ii) Structures of Xenon fluorides cannot be explained by Valence Bond approach.
- ANS: (i) It is due to higher lattice energy of oxides as compared to fluorides as oxide ion is dinegative, whereas fluoride ion is mononegative.
 (ii) It is because Xe is noble gas and has lone pair of electrons in its d-orbitals. Size of 5d orbital in Xe is large enough for effective overlapping. 5p and 5d orbitals of Xe differ by 960 kJ mol^{-1} , that is sp_3d hybridisation, contribution of 5d orbital is objectionable.
- 25 Explain the following facts giving appropriate reason in each case:
 (i) NF_3 is an exothermic compound whereas NCl_3 is not. 2
 (ii) All the bonds in SF_4 are not equivalent.
- ANS: (i) It is because F_2 is stronger oxidising agent than Cl_2 , therefore, NF_3 is exothermic compound, whereas NCl_3 is endothermic.
 (ii) In SF_4 , bonds are in different planes, therefore, they are not equivalent.
- 26 How would you account for the following:
 (i) The following order of increase in strength of acids: 2
 $\text{PH}_3 < \text{H}_2\text{S} < \text{HCl}$

(ii) The oxidising power of oxoacids of chlorine follows the order:
 $\text{HClO}_4 < \text{HClO}_3 < \text{HClO}_2 < \text{HClO}$

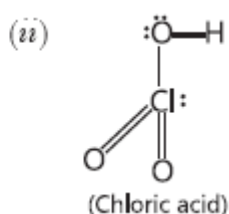
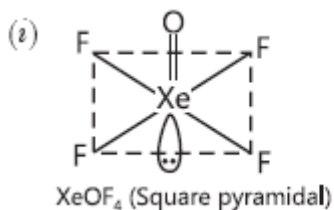
ANS: (i) It is because greater the difference in electronegativity, more will be polarity and more will be acidic character.

(ii) It is because HClO is least stable and gives $[\text{O}]$ most easily, whereas tendency to give oxygen in HClO_4 is least where the number of oxygen is maximum and oxidising power is least.

27 Draw the structures of the following molecules :

(i) XeOF_4

(ii) HOClO_2



ANS:

28 Complete the following reaction equation:

(i) $\text{XeF}_4 + \text{H}_2\text{O} \rightarrow$

(ii) $\text{I}_2 + \text{H}_2\text{O} + \text{Cl}_2 \rightarrow$

ANS: (i) $6\text{XeF}_4 + 12\text{H}_2\text{O} \rightarrow 4\text{Xe} + 2\text{XeO}_3 + 24\text{HF} + 3\text{O}_2$

(ii) $\text{I}_2 + 6\text{H}_2\text{O} + 5\text{Cl}_2 \rightarrow 2\text{HIO}_3 + 10\text{HCl}$

29 Complete the following reaction equation:

(i) $\text{XeF}_6 + \text{H}_2\text{O} \rightarrow$

(ii) $\text{FeSO}_4 + \text{H}_2\text{SO}_4 + \text{Cl}_2 \rightarrow$

ANS: (i) $\text{XeF}_6 + 3\text{H}_2\text{O} \rightarrow \text{XeO}_3 + 6\text{HF}$

(ii) $2\text{FeSO}_4 + \text{H}_2\text{SO}_4 + \text{Cl}_2 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + 2\text{HCl}$

30 Which of the following statement is incorrect?

(a) ONF is isoelectronic with NO_2^-

(b) OF_2 is an oxide of fluoride

(c) Cl_2O_7 is an anhydride of perchloric acid

(d) O_3 molecule is bent

ANS: (b) It is fluoride of oxygen.

\because 'F' is more electronegative than O.

31 Name the two most important allotropes of sulphur. Which one of the two is stable at room temperature? What happens when the stable form is heated above 370 K?

ANS: (i) Rhombic sulphur (ii) Monoclinic sulphur

Rhombic sulphur is more stable at room temperature. When Rhombic sulphur is heated at 370 K, it changes to monoclinic sulphur.

32 (i) $\text{NaOH} + \text{Cl}_2 \xrightarrow{\text{hot and conc.}}$

(ii) $\text{XeF}_4 + \text{O}_2\text{F}_2 \xrightarrow{143 \text{ K}}$

(iii) $\text{Br}_2 + \text{F}_2 \xrightarrow{\text{excess}}$

Complete the following chemical equations:

(i) $6\text{NaOH} + 3\text{Cl}_2 \xrightarrow{\text{hot and conc.}} 5\text{NaCl} + \text{NaClO}_3 + 3\text{H}_2\text{O}$

(ii) $\text{XeF}_4 + \text{O}_2\text{F}_2 \xrightarrow{143 \text{ K}} \text{XeF}_6 + \text{O}_2$

(iii) $\text{Br}_2 + 3\text{F}_2 \xrightarrow{\text{excess}} 2\text{BrF}_3$

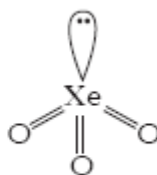
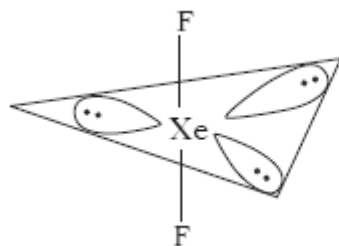
ANS:

33 (a) Using VSEPR theory, predict the possible structures of the following:

(i) XeF_2 (ii) XeO_3 .

- (b) (i) Why is SF₆ Kinetically inert?
 (ii) Why is F₂ more reactive than Cl₂ inspite of chlorine has higher electron gain enthalpy than fluorine?
 (iii) Why is HF weaker acid than HCl?

ANS: (a) (i) XeF₂ — linear (ii) XeO₃ — Pyramidal



(b) (i) Because sulphur is sterically

protected by six 'F' atoms.

- (ii) Bond dissociation enthalpy of F₂ is lower than that of Cl₂ involved in the process.
 (iii) Bond dissociation enthalpy of HCl is lower than that of HF.

34 Among the following, which one is a wrong statement.

- (a) PH₅ and BiCl₅ do not exist.
 (b) pπ-dπ bonds are present in SO₂.
 (c) SeF₄ and CH₄ have same shape.
 (d) I₃ has bent geometry.

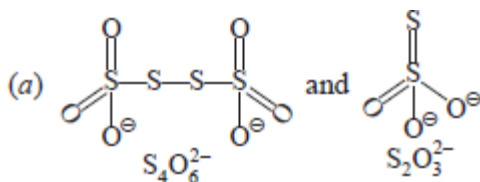
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ANS: (c) SeF₄ has see-saw shape where as CH₄ is tetrahedral

35 In which of the pair of ions, both species contain S—S bond?

- (a) S₄O₆²⁻, S₂O₃²⁻ (b) S₂O₇²⁻, S₂O₈²⁻
 (c) S₄O₆²⁻, S₂O₇²⁻ (d) S₂O₇²⁻, S₂O₃²⁻

1



ANS:

- 36 Which one of the following order is correct for the bond dissociation enthalpy of halogen molecule? (a) Br₂ > I₂ > F₂ > Cl₂ (b) F₂ > Cl₂ > Br₂ > I₂
 (c) I₂ > Br₂ > Cl₂ > F₂ (d) Cl₂ > Br₂ > F₂ > I₂

1

ANS: (d) In F₂, therefore, inter electronic repulsion, therefore, bond dissociation enthalpy is less.

37 Which is strongest acid in the following:

- (a) HClO₄ (b) H₂SO₃
 (c) H₂SO₄ (d) HClO₃

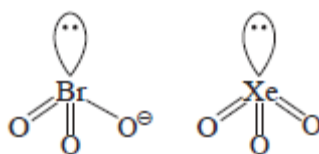
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ANS: (a) HClO₄ is strongest because 'Cl' has +7 oxidation state

38 In which of the following pairs, the two species are isostructural

- (a) SO₃²⁻ and NO₃⁻ (b) BF₃ and NF₃
 (c) BrO₃⁻ and XeO₃ (d) SF₄ and XeF₄

1



ANS: (c) Both are pyramidal.

39 The correct order of oxidising power is

- (a) HClO₄ > HClO₃ > HClO₂ > HClO
 (b) HOCl > HClO₂ > HClO₃ > HClO₄
 (c) HClO₃ > HClO₄ > HClO₂ > HClO
 (d) HClO₂ > HOCl > HClO₃ > HClO₄

1

ANS: (b) $\text{HOCl} \rightarrow \text{HCl} + [\text{O}]$
It is strongest oxidising agent whereas HClO_4 is weakest.

- 40 The correct order of acid strength is
 (a) $\text{HClO}_4 < \text{HClO}_3 < \text{HClO}_2 < \text{HClO}$
 (b) $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$
 (c) $\text{HClO}_4 < \text{HClO} < \text{HClO}_2 < \text{HClO}_3$
 (d) $\text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4 < \text{HClO}$

ANS: (b) As oxidation state increases, acid strength increases.

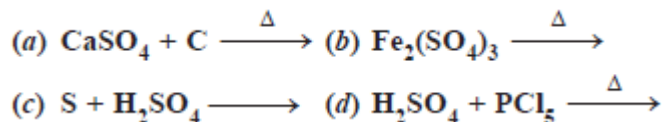
- 41 Among the following which is strongest oxidising agent.
 (a) Br_2 (b) I_2
 (c) Cl_2 (d) F_2

ANS: (d) F_2 is best oxidising agent.

- 42 The correct order of bond angles in the following species is
 (a) $\text{Cl}_2\text{O} < \text{ClO}_2^- < \text{ClO}_2$
 (b) $\text{ClO}_2^- < \text{Cl}_2\text{O} < \text{ClO}_2$
 (c) $\text{Cl}_2\text{O} < \text{ClO}_2 < \text{ClO}^-$
 (d) $\text{ClO}_2 < \text{Cl}_2\text{O} < \text{ClO}_2^-$

ANS: (b) $\text{ClO}_2^- < \text{Cl}_2\text{O} < \text{ClO}_2$ is increasing order of bond angle.

- 43 Sulphur trioxide can be obtained by which of the following:



ANS: (b) $\text{Fe}_2(\text{SO}_4)_3 \xrightarrow{\Delta} \text{Fe}_2\text{O}_3 + 3\text{SO}_3$

- 44 When Cl_2 reacts with hot and conc. NaOH , the oxidation number of chlorine changes from
 (a) zero to +1 and zero to +5
 (b) 0 to -1 and 0 to +5
 (c) zero to -1 and zero to +3
 (d) 0 to +1 and 0 to -3

ANS: (b) Cl_2 has oxidation number 0, in Cl^- (-1) and in ClO_3^- (+5).
 $3\text{Cl}_2 + 6\text{NaOH}(\text{hot and conc.}) \rightarrow 5\text{NaCl} + \text{NaClO}_3 + 3\text{H}_2\text{O}$

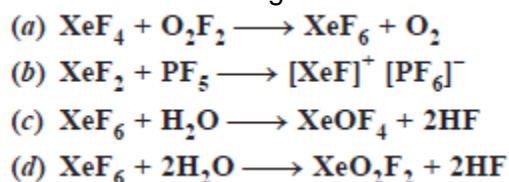
- 45 Acidity of diprotic acid in aqueous solution increases in the order.
 (a) $\text{H}_2\text{S} < \text{H}_2\text{Se} < \text{H}_2\text{Te}$ (b) $\text{H}_2\text{Se} < \text{H}_2\text{S} < \text{H}_2\text{Te}$
 (c) $\text{H}_2\text{Te} < \text{H}_2\text{S} < \text{H}_2\text{Se}$ (d) $\text{H}_2\text{Se} < \text{H}_2\text{Te} < \text{H}_2\text{S}$

ANS: (a) Because bond dissociation enthalpy decreases as atomic size increases.

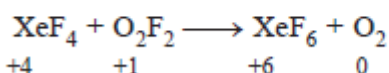
- 46 Chlorine reacts with excess of NH_3 to form (a) NH_4Cl (b) $\text{N}_2 + \text{HCl}$
 (c) $\text{N}_2 + \text{NH}_4\text{Cl}$ (d) $\text{NCl}_3 + \text{HCl}$

ANS: (c) $8\text{NH}_3 + 3\text{Cl}_2 \rightarrow 6\text{NH}_4\text{Cl} + \text{N}_2$

- 47 Which of the following reactions is an example of redox reaction?



(a) Redox reaction because $\text{Xe}(+4)$ is getting oxidised to $\text{Xe}(+6)$ and $\text{O}(+1)$ is reduced to zero.



ANS:

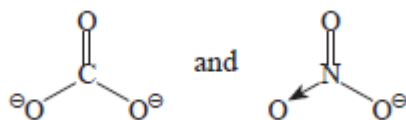
- 48 On addition of conc. H_2SO_4 to a chloride salt, colourless fumes are evolved but in case of iodide salt, violet fumes come out. This is because (a) H_2SO_4 reduces HI to I_2
 (b) HI is of violet colour
 (c) HI gets oxidised to I_2
 (d) HI changes to HIO_3

ANS: (c) HI gets oxidised to I_2

- 49 Which of the following pairs of ions are isoelectronic and isostructural?

- (a) CO_3^{2-} , NO_3^- (b) ClO_3^- , CO_3^{2-}
 (c) SO_3^{2-} , NO_3^- (d) ClO_3^- , SO_3^{2-}

(a) CO_3^{2-} and NO_3^- are isoelectronic (32 electrons) and Planar.



ANS:

- 50 Affinity for hydrogen decreases in the group from fluorine to iodine. Which of the halogen acids should have highest bond dissociation enthalpy? (a) HF (b) HCl
 (c) HBr (d) HI

ANS: (a) HF has highest bond dissociation enthalpy due to smaller bond length.

- 51 Bond dissociation enthalpy of E—H (E = element) bonds is given below. Which of the compounds

Compound	NH_3	PH_3	AsH_3	SbH_3
$\Delta_{\text{diss}}(\text{E—H})/\text{kJ mol}^{-1}$	389	322	297	255

- (a) NH_3 (b) PH_3
 (c) AsH_3 (d) SbH_3

will act as strongest reducing agent?

ANS: (d) SbH_3 due to lowest bond dissociation enthalpy.

- 52 Hot conc. H_2SO_4 acts as moderately strong oxidising agent. It oxidises both metals and non-metals. Which of the following element is oxidised by conc. H_2SO_4 into two gaseous products? (a) Cu (b) S
 (c) C (d) Zn

ANS: (c) $\text{C} + 2\text{H}_2\text{SO}_4(\text{conc.}) \rightarrow \text{CO}_2 + \text{SO}_2 + 2\text{H}_2\text{O}$

- 53 Which of the following options are not in accordance

(a) $\text{F}_2 > \text{Cl}_2 > \text{Br}_2 > \text{I}_2$	Oxidising power.
(b) $\text{MI} > \text{MBr} > \text{MCl} > \text{MF}$	Ionic character of metal halide.
(c) $\text{F}_2 > \text{Cl}_2 > \text{Br}_2 > \text{I}_2$	Bond dissociation enthalpy.
(d) $\text{HI} < \text{HBr} < \text{HCl} < \text{HF}$	Hydrogen-halogen bond strength.

with the property mentioned against them?

ANS: (b) $\text{MF} > \text{MCl} > \text{HBr} > \text{MI}$ Ionic character

(c) $\text{Cl}_2 > \text{Br}_2 > \text{F}_2 > \text{I}_2$

- 54 Which of the following statements are correct? [NCERT Exemplar Problem]

- (a) Among halogens, radius ratio between iodine and fluorine is maximum.
 (b) Leaving F—F bond, all halogens have weaker X—X bond than X—X' bond in interhalogens.
 (c) Among interhalogen compounds maximum number of atoms are present in iodine fluoride.
 (d) Interhalogen compounds are more reactive than halogen compounds.

ANS: (a), (c) and (d) are correct. F_2 is more reactive than interhalogen compounds.

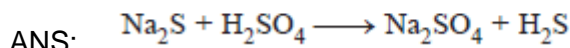
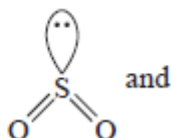
(b) is not correct, other halogens are less reactive than interhalogen compounds.

- 55 Which of the following statements are correct for SO_2 gas? [NCERT Exemplar Problem]

- (a) It acts as bleaching agent in moist conditions.
 (b) It's molecule has linear geometry.

- (c) Its dilute solution is used as disinfectant.
 (d) It can be prepared by the reaction of dilute H_2SO_4 with metal sulphide.

(b) and (d). Its molecule is bent.



- 56 Which of the following orders are correct as per the properties mentioned against each? (a) $\text{As}_2\text{O}_3 < \text{SiO}_2 < \text{P}_2\text{O}_3 < \text{SO}_2$ Acid strength. 1
 (b) $\text{AsH}_3 < \text{PH}_3 < \text{NH}_3$ Enthalpy of vapourisation.
 (c) $\text{S} < \text{O} < \text{Cl} < \text{F}$ More negative electron gain enthalpy.
 (d) $\text{H}_2\text{O} > \text{H}_2\text{S} > \text{H}_2\text{Se} > \text{H}_2\text{Te}$ Thermal stability.

ANS: (a) and (d) are correct (b) and (c) are wrong.

(b) $\text{PH}_3 < \text{AsH}_3 < \text{NH}_3$

(c) $\text{Cl} > \text{F} > \text{S} > \text{O}$

- 57 Match the compounds given in Column I with the hybridisation and shape given in Column II and mark the correct option.

Column I	Column II
(A) Xe F ₆	(1) sp_3d_3 – distorted octahedral
(B) Xe O ₃	(2) sp_3d_2 - square planar
(C) Xe OF ₄	(3) sp_3 - pyramidal
(D) Xe F ₄	(4) $\text{sp}_3 \text{d}_2$ - square pyramidal

Code:

(a) A (1) B (3) C (4) D (2)

(b) A (1) B (2) C (4) D (3)

(c) A (4) B (3) C (1) D (2)

(d) A (4) B (1) C (2) D (3)

ANS: (a) A (1) B (3) C (4) D (2)

- 58 Match the items of Columns I and II and mark the correct option.

Column I	Column II
(A) H_2SO_4	(1) Highest electron gain enthalpy
(B) CCl_3NO_2	(2) Chalcogen
(C) Cl_2	(3) Tear gas
(D) Sulphur	(4) Storage batteries

Code:

(a) A (4) B (3) C (1) D (2)

(b) A (3) B (4) C (1) D (2)

(c) A (4) B (1) C (2) D (3)

(d) A (2) B (1) C (3) D (4)

ANS: (a) A (4) B (3) C (1) D (2)

- 59 In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. (Q.27 to Q.29)
- (a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
 (b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion. 1
 (c) Assertion is correct, but reason is wrong statement.
 (d) Assertion is wrong but reason is correct statement.
 (e) Both assertion and reason are wrong statements.

Assertion: HI cannot be prepared by the reaction of KI with concentrated H_2SO_4

Reason: HI has lowest H–X bond strength among halogen acids.

ANS: (b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion. HI gets oxidised to I₂ as H₂SO₄(conc.) is oxidising agent.

60

In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. (Q.27 to Q.29)

(a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.

(b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.

(c) Assertion is correct, but reason is wrong statement.

(d) Assertion is wrong but reason is correct statement.

(e) Both assertion and reason are wrong statements. Assertion: Both rhombic and monoclinic sulphur exist as S₈ but oxygen exists as O₂.

Reason: Oxygen forms pπ – pπ multiple bond due to small size and small bond length but pπ – pπ bonding is not possible in sulphur.

ANS: (a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.

61

In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. (Q.27 to Q.29)

(a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.

(b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.

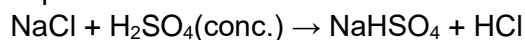
(c) Assertion is correct, but reason is wrong statement.

(d) Assertion is wrong but reason is correct statement.

(e) Both assertion and reason are wrong statements. Assertion: NaCl reacts with concentrated H₂SO₄ to give colourless fumes with pungent smell. But on adding MnO₂ the fumes become greenish yellow.

Reason: MnO₂ oxidises HCl to chlorine gas which is greenish yellow.

ANS: (a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.



62

The mixture of conc. HCl and anhydrous ZnCl₂ is called _____.

ANS: Lucas reagent

63

Out of H₂O and H₂S which has higher bond angle? _____.

ANS: H₂O

64

Tin reacts with excess of chlorine gas to form _____.

ANS: SnCl₄

65

Lead sulphide is heated with air to form _____.

ANS: PbO + SO₂

66

I₂ gets oxidised to _____ by conc. HNO₃.

ANS: HIO₃

67

Interhalogen compounds are more reactive than halogens except fluorine. [True/False]

ANS: True. It is due to less effective overlapping.

68

ClF is neutral molecule isoelectronic with ClO⁻. [True/False]

ANS: True. Both have 17 + 9 = 26 electrons.

69

NaF reacts with SbF₆ to form Na⁺ [SbF₇]⁻. [True/False]

ANS: It is true. $\text{NaF} + \text{XeF}_6 \rightarrow \text{Na}^+ [\text{XeF}_7]^-$

70 Hydrolysis of XeF_6 is redox reaction. [True/False] 1

ANS: It is false. $\text{XeF}_6 + 3\text{H}_2\text{O} \rightarrow \text{XeO}_3 + 6\text{HF}$.

71 Ozone is thermodynamically less stable than O_2 . [True/False] 1

ANS: True

72 Sulphur trioxide when dissolved in H_2SO_4 , the product formed is
(a) H_2SO_3 (b) H_2SO_5 1

(c) $\text{H}_2\text{S}_2\text{O}_7$ (d) $\text{H}_2\text{S}_2\text{O}_8$

ANS: (c) $\text{H}_2\text{SO}_4 + \text{SO}_3 \rightarrow \text{H}_2\text{S}_2\text{O}_7$

73 Among the following which one exhibits both +ve and -ve oxidation states
(a) Cs (b) F 1

(c) K (d) I

ANS: (d) I shows both positive and negative oxidation states.

74 Which of the following has highest boiling point?
(a) Kr (b) Xe 1

(c) He (d) Ne

ANS: (b) Xe has highest boiling point due to more surface area, more van der waals' forces of attraction, hence higher boiling point.

75 Which of the following is most reactive?
(a) I_2 (b) ICl 1

(c) Cl_2 (d) Br_2

ANS: (b) ICl is most reactive due to low bond dissociation enthalpy as it has least effective overlapping.

76 In the preparation of compounds of Xe, Bartlett had taken $\text{O}_2^+ \text{Pt F}_6^-$ as a base compound. This is because [NCERT Exemplar Problem] 1

(a) both O_2 and Xe have same size.

(b) both O_2 and Xe have same electron gain enthalpy.

(c) both O_2 and Xe have almost same ionisation enthalpy.

(d) both Xe and O_2 are gases.

ANS: (c) both O_2 and Xe have almost same ionisation enthalpy

77 Reduction potentials of some ions are given below. Arrange them in decreasing order of oxidising 1

Ion	ClO_4^-	IO_4^-	BrO_4^-
Reduction potential E^\ominus/V	$E^\ominus = 1.19\text{V}$	$E^\ominus = 1.65\text{V}$	$E^\ominus = 1.74\text{V}$

[NCERT Exemplar Problem]

(a) $\text{ClO}_4^- > \text{IO}_4^- > \text{BrO}_4^-$ (b) $\text{IO}_4^- > \text{BrO}_4^- > \text{ClO}_4^-$

power. (c) $\text{BrO}_4^- > \text{IO}_4^- > \text{ClO}_4^-$ (d) $\text{BrO}_4^- > \text{ClO}_4^- > \text{IO}_4^-$

ANS: (c) Higher the reduction potential better will be oxidising agent.

78 (a) ICl_2 , ClO_2 (b) BrO_2^- , BrF_2^+ 1

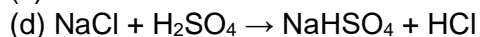
Which of the following is isoelectronic pair?

(b) BrO_2^- ($35 + 16 + 1 = 52$)

ANS: BrF_2^+ ($35 + 9 + 9 - 1 = 52$)

79 In which of the following reactions conc. H_2SO_4 is used as an oxidising reagent? (a) $\text{CaF}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + 2\text{HF}$ 1

(b) $2\text{HI} + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{SO}_2 + 2\text{H}_2\text{O}$



ANS: (b) and (c) Cu is getting oxidised to CuO which reacts with H_2SO_4 to form CuSO_4 and H_2O and H_2SO_4 gets reduced to SO_2 .

80 Which of the following statements are true? [NCERT Exemplar Problem]

(a) Only type of interactions between particles of noble gases are due to weak dispersion forces.

(b) Ionisation enthalpy of molecular oxygen is very close to that of xenon.

(c) Hydrolysis of XeF_6 is a redox reaction.

(d) Xenon fluorides are not reactive.

ANS: (a) and (b) are true, (c) $\text{XeF}_6 + 3\text{H}_2\text{O} \rightarrow \text{XeO}_3 + 6\text{HF}$ is not a redox reaction.

Xenon fluorides are reactive due to low bond dissociation enthalpy.

81 Match the items of Columns I and II and mark the correct option.

Column I

(A) Its partial hydrolysis does not change oxidation state of central atom

(B) It is used in modern diving apparatus

(C) It is used to provide inert atmosphere for filling electrical bulbs

(D) Its central atom is in sp^3d^2 hybridisation

Column II

(1) He

(2) XeF_6

(3) XeF_4

(4) Ar

Code:

(a) A (1) B (4) C (2) D (3)

(b) A (1) B (2) C (3) D (4)

(c) A (2) B (1) C (4) D (3)

(d) A (1) B (3) C (2) D (4)

ANS: (c) A (2) B (1) C (4) D (3)

82 In the following question a statement of assertion followed by a statement of reason is given.

Choose the correct answer out of the following choices.

(a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.

(b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.

(c) Assertion is correct, but reason is wrong statement.

(d) Assertion is wrong but reason is correct statement.

(e) Both assertion and reason are wrong statements.

Assertion: SF_6 cannot be hydrolysed but SF_4 can be.

Reason: Six F atoms in SF_6 prevent the attack of H_2O on sulphur atom of SF_6 .

ANS: (a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.

83 NaBr reacts with H_3PO_4 to form _____ and _____.

ANS: $\text{Na}_3\text{PO}_4 + \text{HBr}$

84 Xe reacts with O_2F_2 at low temperature to form _____ and _____.

ANS: $\text{XeF}_2 + \text{O}_2$

85 Cu does not react with dil. H_2SO_4 . [True/False]

ANS: True

86 Sucrose on reaction with conc. H_2SO_4 gives sugar charcoal. [True/False]

ANS: True

87 $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ reacts with conc. H_2SO_4 and becomes dirty white. [True/False]

ANS: True