CHEMISTRY

PHYSICAL, INORGANIC, AND ORGANIC CHEMISTRY

P-BLOCK ELEMENTS (HALOGEN & NOBLE GASES)

Exercise 1 Part 1

1. Name the compound which is used to obtain fluorine gas on electrolysis. At which electrode does F_2 appears?

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2. Name the valuable halogen impurities present in chile salt petre $(NaNO_3)$.

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3. What idea lead to the discovery of Xenon fluorides?

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4. Considering the parameters such as bond dissociation enthalpy, electron gain enthalpy and hydration enthalpy, compare the oxidizing power of F_2 and Cl_2.

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5. Write all the common oxidation states of halogens:

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6. Write and explain the order of X—X bond energy for halogen down the group.

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7. Draw the Lewis dot structures of the following compounds:

$HClO_3, XeOF_4, XeO_2F_2, ICl_2^-, ICl_4^-$

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8. Draw the Lewis dot structures of the following multicentred compounds:

I_2O_5, Cl_2O_7

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9. Give the formula and describe the structure of a noble gas species which is isostructural with :

$(i) ICI_4^- (ii) Ibr_2^- (iii) BrO_3^-$

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10. Arrange the XeF_2, XeF_4, XeF_6 in decreasing order of Xe-F bond length, give reason also.

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11. Answer the following with relevant reasons .

(i) The boiling of noble gases increase with increase in atomic number .

(ii) Why helium and neon do not from clathrate compounds with quinol ?

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12. Why are halogens coloured?

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13. Write the reaction of F_2 and Cl_2 with water.

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14. State what happens when halogens react with a cold dilute solution of NaOH?

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15. State what happens when halogens (X = Cl/ Br / I) react with hot and conc. Solution of NaOH?

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16. Which halogen is oxidised by conc. HNO_3? Give reaction.

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17. Explain the following with proper reasons :

(i) Fluorine cannot be prepared from fluorides by chemical oxidation.

(ii) Fluorine does not from F_3^- (polyhalide) ion

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18. Write chemical reactions Involved In preparation of $HClO_3$ & $HClO_4$ by displacement from their salts.

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19. When a blue litmus is dipped into a solution of hypochlorous acid, It turns red and then gets decolourised. Explain.

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20. Explain why fluorine forms only one oxoacid, HOF.

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21. Predict the products when the following reactions are carried out

(i) In acidic medium when SO_2 is passed through $NaClO_3$.

(ii) $HCl + KlO_3 + Kl \rightarrow$

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22. What happen when ClO_2 dissolves in $NaOH$?

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23. Arrange the following acids in the decreasing order of their acid strength:

HF, HCl, HBr, HI

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24. How can you prepare Cl_2 from HCl and HCI from Cl_2? Write reactions only.

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25. HI can not be prepared by heating Nal with concentrated H_2SO_4. Give the method which is preferred for the preparation of HI.

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26. What is aqua regia? Write its reaction product with gold and platinum.

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27. Explain the following with proper reason:

(i) Anhydrous HCl is a bad conductor of electricity while aqueous HCl is a

good conductor.

(ii) HF is not stored in glass bottles but kept in wax lined bottles.

(iii) HF has a greater electronegativity difference and more ionic character than HCI, HBr and Hl but it the weakest acid.

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28. Fill in the blanks: (i) Among halogen acids (hydrogen halides) .... is the strongest reducing agent.

(ii) $H_2SO_4 + HI \rightarrow$ _____ + _____ + _____

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29. Predict the products when the following reactions are carried out:

(i) Red lead is boiled with concentrated HCI.

(ii) $SiO_2 + HF \rightarrow$

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30. Write the method of preparation of XeF_2, XeF_4&XeF_6.

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31. How is $XeOF_4$ prepared?

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32. Does the hydrolysis of XeF_4 lead to a redox reaction?

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33. Write the complete and the partial hydrolysis product of XeF_6.

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34. Complete the following reactions:

(i) $XeF_2 + H_2 \rightarrow$, (ii) $XeF_6 + SiO_2 \rightarrow$ (iii) $XeF_6 + SbF_5 \rightarrow$

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35. Complete the following reactions:

(a) $\underset{\text{(Equal volume)}}{Cl_2 + F_2} \xrightarrow{473K}$, (b) $I_2 + \underset{\text{(Excess)}}{3Cl_2} \rightarrow$ (c $)Br_2 + 3F_2 \rightarrow$ (d) $Br_2 + \underset{\text{(Excess)}}{5F_2} \rightarrow$

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36. Why is ICI more reactive than I_2?

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37. (a) Name two interhalogens of AB_3 type.

(b) Write the hydrolysis product of IC l?

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38. Explain the following with proper reason:

(i) Bleaching of flowers by chlorine is permanent while after bleaching with SO_2, the colour returns.

(ii) Iodine dissolves more in KI solution than in water.

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39. What happens when ? (Give balanced equations)

(i) Sodium iodate is treated with sodium bisulphite solution.

(ii) Chlorine is passed over slaked lime.

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Exercise 1 Part 2

1. Which of the following gaseous molecules is monoatomic ?

A. (A) chlorine

B. (B) hellium

C. (C) oxygen

D. (D) nitrogen

Answer: B

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2. Which one of the following noble gases is not found in atmosphere ?

A. (A) Rn

B. (B) Kr

C. Ne

D. (D) Ar

Answer: A

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3. The inert gas abundantly found in atmosphere is:

A. (A) Ar

B. (B) Kr

C. (C) He

D. (D) Xe

Answer: A

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4. Electrolysis of aqueous solution of Brine (NaCI) gives

A. (A)Cl_2

B. (B) H_2

C. (C) NaHO

D. (D) all of these

Answer: D

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5. The catalyst used in the Deacon's process for the manufacture of chlorine is

A. (A) Cu

B. (B) An alloy of Copper

C. (C) $CuCl_2$

D. CuS

Answer: C

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6. Which one of the following configuration represents a noble gas ?

A. $1s^2 2s^2 p^6, 3s^2$

B. $1s^2 2s^2 p^6, 3s^1$

C. $1s^2 2s^2 p^6$

D. $1s^2 2s^2 p^6, 3s^2 p^6, 4s^2$

Answer: C

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7. Astatine is the element below iodine in the group $VIIA$ of the periodic table. Which of the following statements is not true for astatine?

A. (A) It is less electronegative than iodine.

B. (B) It will exhibit Only —1 Oxidation state.

C. (C) Intermolecular forces between the astatine molecules will be larger than that between iodine molecules.

D. (D) None of these.

Answer: B

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8. Which is Wrong statement?

A. (A) Basic nature of X- is in order $F^- > Cl^- > Br^- > I^-$

B. (B) Electron gain enthalpy in order F gt Cl gt Brgt I.

C. (C) The Ionic character of M—X bond decreases in the order M—F gt M—Clgt M—Brgt M—l

D. (D) Among F^-, Cl^-, Br^- and I^-, F^- has the highest enthalpy of hydration.

Answer: B

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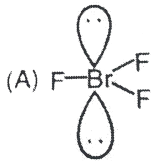
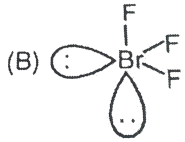
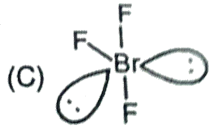
9. Which of the following structure is correct for BrF_3?

A. 

B. 

C. 

D. none of these

Answer: C

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10. Among the following molecules, $(i)XeO_3(ii)XeOF_4(iii)XeF_6$ those having same number of lone pairs on Xe are:

A. (A) (i) and (ii) only

B. (B) (i) and (iii) only

C. (C) (ii) and (iii) only

D. (D) (i),(ii) and (iii)

Answer: D

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11. Select the incorrect match

A. (A) XeF_2 : linear

B. (B) XeF_4 : square planar

C. (C) XeF_6 : distorted octahedral

D. (D) XeO_3: trigonal planar

Answer: D

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12. Correct order of boiling point of halogens is

A. $F_2 < Cl_2 < Br_2 < I_2$

B. $Cl > F_2 > Br_2 > I_2$

C. $F_2 > Cl_2 > Br_2 > I_2$

D. $Cl_2 < F_2 < Br_2 < I_2$

Answer: A

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13. Which of the following statement is correct?

A. (A) Helium has abnormal behaviour on liquefication

B. (B) Iodine is readily soluble in CS_2 and the solution is purple In colour

C. (C) Helium do not form any clathrate

D. (D) All of these

Answer: D

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14. Chlorine gas is dried over:

A. CaO

B. NaOH

C. conc. H_2SO_4

D. dil. H_2SO_4

Answer: C

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15. F_2 reacts with H_2O as follows:

$$F_2 + H_2O \rightarrow H^+ + F^- + O_2$$

Which of the following halogens shows same reaction but In opposite direction?

A. Br_2

B. Cl_2

C. I_2

D. All

Answer: C

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16. Chlorine acts as a bleaching agent only in the presence of

A. (A) dry air

B. (B) moisture

C. (C) sunlight

D. (D) pure oxygen

Answer: B

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17. Select the Incorrect statement:

A. (A) Perchioric acid is a stronger acid than sulphuric acid

B. (B) Only one oxyacid [HOF] is formed by fluorine

C. (C) The most stable oxy-acid of chlorine is perchioric acid

D. (D) None of these

Answer: D

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18. Cl_2O_6 reacts with water and alkali to give:

A. (A) Only sodium chlorate

B. (B) Only sodium perchlorate

C. (C) Both sodium chlorate and sodum perchlorate

D. (D) None of these

Answer: C

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19. On heating $KClO_3$ we get:

A. (A) $KClO_2 + O_2$

B. (B) $KCl + O_2$

C. (C) $KCl + O_3$

D. (D) $KCl + O_2 + O_3$

Answer: B

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20. The following acids have been arranged in order of decreasing acid strength. Identify the correct order.

ClOH (I) , BrOH (II) , IOH(III)

A. (A) I gt II gt III

B. (B) II gt I gt III

C. (C) III gt II gt I

D. (D) I gt III gt II

Answer: A

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21. ClO_3^- ion leads with I_2 to from

A. (A) ClO_4^-

B. (B) IO_3^- and Cl_2

C. (C) ICI and O_2

D. (D) ICI and O_3

Answer: B

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22. The strongest acid amongst the following is:

A. (A) $HClO_4$

B. (B) $HClO_3$

C. (C) $HClO_2$

D. (D) HClO

Answer: A

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23. Which of the following halogen hydrides will have the weakest conjugate base?

A. (A)HF

B. (B)HCI

C. (C)HBr

D. (D)HI

Answer: D

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24. Concentrated H_2SO_4 cannot be used to prepare HBr from NaBr , because it ,

A. (A) reduces HBr

B. (B) oxidises HBr

C. (C) disproportionates HBr

D. (D) reacts slowly with NaBr

Answer: B

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25. Hydrogen bromide is dried by passing the gas through:

A. (A) quick line

B. anhydrous calcium chloride

C. (C) potassium hydroxide pellet

D. (D)con. $H2SO_4$

Answer: B

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26. Which one of the hydracid does not form any precipitate with $AgNO_3$?

A. (A) HF

B. (B) HCI

C. (C) HBr

D. (D) HI

Answer: A

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27. Which can do glass etching?

A. A) HlO_4

B. (B) HF

C. (C) HNO_3

D. (D) SiF_4

Answer: B

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28. Identify A and B In following reaction,

$H_2SO_4 + HBr \rightarrow A + B + H_2O$

A. (A) Br_2, SO_3

B. (B) Br_2, S

C. (C) BrO_3^-, SO_3

D. (D) Br_2, SO_2

Answer: D

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29. Which of the following is obtained whon gold is troated with aquaregia,

A. $AuCl_4$

B. $AuCl_3$

C. $[AuCl_4]^-$

D. $[AuCl_4]^+$

Answer: C

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30. Which of the following hydrogen halide is most volatile?

A. HCl

B. (B) HF

C. (C) HI

D. (D) HBr

Answer: A

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31. which of the following has maximum bond strength:

A. (A) HI

B. (B) HCI

C. (C) HF

D. (D) HBr

Answer: C

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32. Which of the following is the strongest acid?

A. (A) HBr

B. (B) HF

C. (C) H_2S

D. (D) PH_3

Answer: A

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33. The number of lone pairs on central atom in XeF_2, XeF_4 and XeF_6 are:

A. (A) 1,2,3

B. (B) 3,2,1

C. (C) 2,2,1

D. (D) 1,3,2

Answer: B

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34. of the following species, one which is non-existent:

A. (A) XeF_6

B. (B)XeF_5

C. XeF_4

D. (D)XeF_2

Answer: B

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35. XeF_2 on complete hydrolysis gives:

A. Xe

B. XeO_2

C. (C) XeO_2F_2

D. (D) XeO_4

Answer: A

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36. Hydrolysis of XeF_4 and $CaCN_2$ gives respectively:

A. (A) XeO_3 and $CaCO_3$

B. (B) XeO_2 and $Ca(OH)_2$

C. (C) $XeOF_3$ and $Ca(OH)_2$

D. (D) $XeOF_2$ and $CaCO_3$

Answer: A

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37. Xenon hexafluoride undergoes hydrolysis in strong alkaline medium:

A. (A) perxenate ion

B. O_2

C. (C) Xenon

D. (D) All of the above

Answer: D

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38. In the inter halogen compounds of AB_3 / AB_5 form which is correct:

A. (A) A is large size halogen

B. (B) B is large size halogen

C. (C)B is small size halogen

D. (D) Both (A) & (C)

Answer: D

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39. Which one of the following is a pseudohalide ?

A. (A) CNO^-

B. (B) $RCOO^-$

C. (C) OCN^-

D. (D) NNN^-

Answer: B

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40. Which of the following behaves like pseudohalogen compound:

A. (A) NC CN

B. (B) CN^-

C. (C) N_3^-

D. (D) l_3^-

Answer: A

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41. Which of the following statement is correct.

A. (A) All interhalogen compounds are gas at room temperature.

B. (B) interhalogen are either gas or liquid at room temperature.

C. (C) Interhalogens can be solid or liquid or gas at room temperature.

D. (D) All interhalogen compounds are liquid at room temperature.

Answer: C

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Exercise 1 Part 3

1. Match the reactions listed in column-I with the products listed in column-II

	Column-I		Column-II (X = Halogen)
(A)	$NH_3 + F_2 \longrightarrow$	(p)	N_2
(B)	NH_3 (excess.) + $Cl_2 \longrightarrow$	(q)	HX
(C)	$NH_3 + Br_2$ (excess.) $\longrightarrow$	(r)	NH_4X
(D)	NH_3 (aq.) + $I_2 \longrightarrow$	(s)	Explosive

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2. Match the reactions listed in column-I with the products listed in column-II

	Column - I		Column - II
(A)	$Cl_2O_6 + H_2O \rightarrow$	(p)	ClO_2
(B)	$NaClO_4(s) + HCl(conc.) \rightarrow$	(q)	$HClO_3$
(C)	$KClO_3 + (COOH)_2 \rightarrow$	(r)	Cl_2O
(D)	$HgO + Cl_2 \xrightarrow{573K}$	(s)	$HClO_4$

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3. Match the compounds listed in column-I with characteristic type of reaction listed in column-II

	Column–I		Column–II
A	XeF_2	(p)	Undergoes hydrolysis with water.
B	XeF_4	(q)	Acts as oxidising agent.
C	XeF_6	(r)	Undergoes addition reaction.
D	XeO_3	(s)	Has lone pair(s) of electrons.
		(t)	Gives disproportionation reaction with H_2O or OH^-.

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Exercise 2 Part 1

1. The X - X bond dissociation energy is minimum in:

A. (A) F_2

B. (B) Cl_2

C. (C) Br_2

D. (D)l_2

Answer: A

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2. iodine is liberated from Kl solution when treated with:

A. (A) $ZnSO_4$

B. (B) $CuSO_4$

C. (C) $NiSO_4$

D. (D) $FeSO_4$

Answer: B

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3. Which is not oxidised by MnO_(2)?

A. (A)F^-

B. (B)Cl^-

C. Br^-

D. (D)l^-

Answer: A

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4. $F_2 + \text{dil NaOH} \rightarrow A + NaF + H_2O$

H_2O + conc. NaOH $\rightarrow$ B + NaF + H_2O

A and B respectively are :

A. OF_2 and O_2

B. O_2 and OF_2

C. Both O_2

D. Both OF_2

Answer: A

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5. When thiosulphate ion is oxidised by iodine. which one of the following ion is produced ?

A. (A) SO_3^{2-}

B. (B) SO_4^{2-}

C. (C) $S_4O_6^{2-}$

D. (D) $S_2O_6^{2-}$

Answer: C

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6. NH_3 (excess) +$Cl_2 \rightarrow NH_4Cl + A$ (gas)

$NH_3 + Cl_2$ (excess) $\rightarrow$ B + HCl

Incorrect statement regarding A and B

A. A is highly reactive gas at room temperature

B. Bond order of gas 'A' is same as C_2^{2-}

C. Compound 'B' is explosive

D. Bond angle of compound B is greater than bond angles of NF_3

Answer: A

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7. Which amongst the following reactions cannot be used for the respective preparation?

A. $2KBr + H_2SO_4(\text{conc.}) \rightarrow K_2SO_4 + 2HBr$

B. $NaCl + H_2SO_4(\text{Conc.}) \rightarrow NaHSO_4 + HCl$

C. $NaHSO_4 + NaCl \rightarrow Na_2SO_4 + HCl$

D. $CaF_2 + H_2SO_4(\text{Conc.}) \rightarrow CaSO_4 + 2HF$

Answer: A

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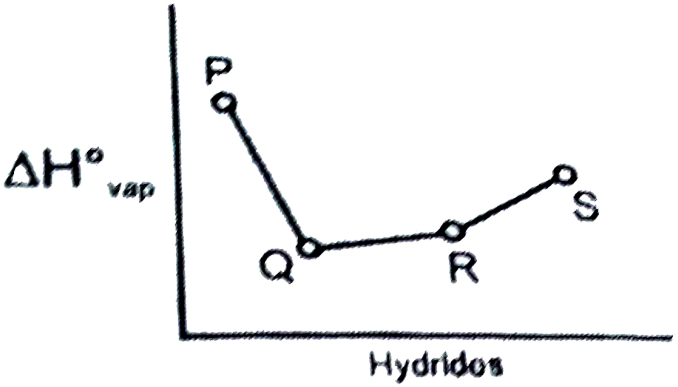
8. $\Delta H_{\text{vaporisation}}$ (KJ/mol) are given for the hydrides of halogens in the following graph. The hydride HF will correspond to



A. (A)P

B. (B)Q

C. (C)R

D. (D)S

Answer: A

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9. Alkali metal hydrogen fluorides have a formula $M[HF_2]$. They are found to contain a linear symmetrical anion having an overall F—H—F

distance of 2.26 Å which may be compared with the H—F bond length of 0.92 Å In the moment. Which of the following is false for the anion?

A. (A) Hydrogen bonding plays a significant role in the existence of the anion

B. (B) Average bond length (H - F) Is 1.13 Å in the anion HF_2^-

C. C) The stretching of H - F bond in the anion Is 0,21 Å

D. (D) H-atom is bonded to two F-atoms through two T bonds in the anion.

Answer: D

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10. A certain hypohalite on treating with hot and conc. NaOH forms anions P and Q. More stable anion among P and Q can be obtained by neutralizing Its conjugate acid X. Upon heating X to very high temperature, a compound Y Is formed, which is used in estimation of a

toxic gas which have 300 times stronger affinity for haemoglobin than dioxygen Then which of the following statements are true.

A. (A) X Is Hl

B. (B) Y is Cl_2O_5

C. (C) Final product Y, has total no. of bonds 5.

D. (D) Y on reacting with toxic gas produces a gas which Is used in fire extinguisher.

Answer: D

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11. When F_2 is passed into a solution of mineral acid X, a greenish yellow gas Y is formed. Which on treating With slaked time forms "Z". When Red litmus is kept in contact with Z, it changes into

A. (A) Blue colour

B. (B) No change in colour

C. (C) White in colour

D. (D) None of these

Answer: C

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12. Which statement regarding iodine trichloride is Incorrect.

A. (A) It forms dimer in gaseous state.

B. (B) In dimer l_2Cl_6, the bridge bonds are longer than the terminal bonds.

C. (C) In solid state, it exist as planar molecule.

D. (D) On hydrolysis, it gives a mixture of iodous acid and hydrochloric acid.

Answer: A

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13. The order of solubility of noble gases in water is

A. (A)HegtArgtKrgtNegtXe

B. (B)HegtNegtArgtKrgtXe

C. (C)XegtArgtKrgtHegtNe

D. (D)XegtKrgtArgtNegtHe

Answer: D

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14. 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.

A. I,II,III

B. II,III,IV

C. I,III,IV

D. (D) All

Answer: B

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15. The formation of $O_2^+[PtF_6]^-$ is the basis for the formation of xenon fluorides. This is because:

A. (A) O_2 and Xe have comparable sizes.

B. (B) both O_2 and Xe are gases.

C. O_2 and Xe have comparable ionisation energies.

D. O_2 and Xe have comparable electronegativities.

Answer: C

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16. $[HXeO_4]^- + Oh \rightarrow [X] + [Y] + O_2 + H_2O$

The products $[X]$ and $[Y]$ in unbalanced reaction are:

A. $[XeO_6]^{4-} \& Xe$

B. $[XeO_6]^{4-} \& XeO_3$

C. $XeO_3 \& Xe$

D. $H_2XeO_4 \& Xe$

Answer: A

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Exercise 2 Part 2

1. The total number of electrons present in 4^{th} shell of Astatatine ($_{85}At$) are:

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2. How many of the following properties of halogen Increases with increase In atomic number.

(a) Number of valence electron (b) Metallic nature (c) Boiling points (d) Atomic radii (e) Density (f)Inoisation enthalpies (g) Electronegativities (h) Reactivity (i) Oxidising nature. (j) $\Delta_{eg}H$ (magnitude wise)

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3. A gas P is obtained at anode during the electrolysis of brine. The gas P when treated with excess of NH_3 released a diatomic gas Q. Find the value of (x - y) where x & y are the molar mass of P and Q.

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4. How many orders are correct:

(a) H—F lt H-Cl lt H—Br lt H—I (Bond length)

(b) H—F lt H—I ltH—Br ltH—I (Acidic strength)

(C) H—I H—Br lt H—Cl ltH—F (Bond strength)

(d) H—Fgt H—Cl gt H—Br gt H—I (Thermodynamic stability)

(e) H—F lt H-Cl lt H—Br lt H—I (Reducing power)

(f) H—Fgt H-Igt H—Brgt H-Cl (Boiling point)

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5. $\underset{\text{Conc.}}{HCl} + \underset{\text{Conc.}}{HNO_3} \rightarrow$

In this reaction change in oxidation number of N Is _____

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6. How many of the following reactions would have HCl as one of the products ?

(a)$CH_4 + CI_2 \rightarrow$ (b) $FeSO_4 + H_2SO_4 + Cl_2 \rightarrow$

(c) $l_2 + Cl_2 + H_2O \rightarrow$

(d) $Cl_2 + H_2O$

(e)$H_2O + SO_2 + Cl_2 \rightarrow$

(f) $SO_3 + Cl_2 \rightarrow$

(g) $NaCI(aq) \xrightarrow{\text{Electrolysis}}$

(h) $Cl_2O_7 + H_2O \rightarrow$

(i)$Cl_2 + NaOH(conc) \rightarrow$

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7. The number of mixed anhydride among the following are Cl_2O , ClO_2 , Cl_2O_5 , Cl_2O_7 , N_2O_5 , NO_2 , N_2O

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8. $Br_2 + F_2$ (excess) $\rightarrow$ A $\xrightarrow{\text{Hydrolysis}}$ B+C

The summation of atomicities of compound A, B and C is :

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9. The number of lone pairs of electrons present in central atom of CIF_3 is:

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10. Which of the following interhalogens exist at room temperature and have central atom hybridization sp^3d^2.

(a) ClF_3 (b) ClF_5 (C) $BrCl_3$ (d) IF_3 (e) IF_5 (f) BrF_5 (g) IF_7 (h) ICl_5 (I) lBr_5(j) BrF_3 (k) $ClBr_5$

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11. How many of the following properties of noble gases would increase from Helium to Radon?

Boiling point, First lonisation enthalpy, Atomic volume, Abundance in atmosphere. Density at STP. Valence electrons, Critical temperature.

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12. The number of cornpounds.'elements oxidised by XeF_2 among following is:

HF, HBr, HCl, HI, NH_3, CrF_2, Pt, S_8

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13. The oxidation state of xenon in perxenate ion is +n. Give the value of 'n'.

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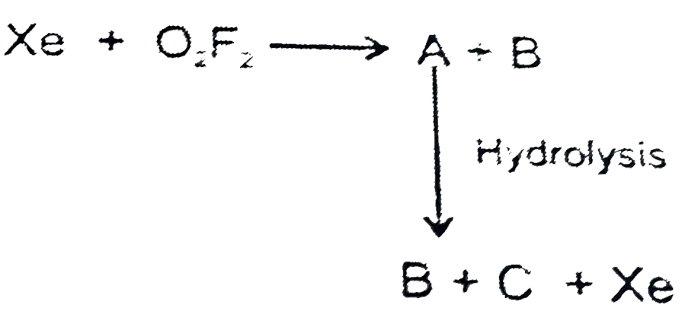
14.



The summation of total no. of lone pairs and σ bonds in in species (A,B and C) is

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15. How many of the given compounds can produce XeO_3.

XeF_6, XeF_4, XeO_2F_2, $XeOF_4$

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Exercise 2 Part 3

1. which one of the following salts will evolve halogen on treatment with conc. H_2SO_4 ?

A. (A) NaCl

B. KI

C. (C) NaBr

D. (D) none of these

Answer: B::C

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2. Which of the following reactions are correct?

A. $NaIO_3 + 5NaI + 6H_2SO_4 \rightarrow 6NaHSO_43H_2O + I_2$

B.

$$2KBr + MnO_2 + 3H_2SO_4 \rightarrow 2KHSO_4 + MnSO_4 + 2H_2O + Br_2$$

C. $K_2Cr_2O_7 + 14HCl \rightarrow 2KCl + 2CrCl_3 + 7H_2O + 3Cl_2$

D. $2K_2MnF_6 + 4SbF_5 \rightarrow 4KSbF_6 + MnF_3 + F_2$

Answer: A::B::C::D

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3. Which of the following will not displace the halogen from the solution of the halide?

A. Br_2 added to NaI

B. (B) Br_2 added to NaCI

C. (C) F_2 added to KCl

D. Cl_2 added to NaF

Answer: B::D

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4. Iodine reacts with hypo to give

A. (A) Nal

B. Na_2SO_3

C. $Na_2S_4O_6$

D. Na_2SO_4

Answer: A::C

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5. $Cl_2 + NH_3$ (excess) $\rightarrow A + B$

A. (A) One of the product Is also obtained by decomposition of $(NH_4)_2Cr_2O_7$

B. (B) Bond order in one of the product is 3

C. (C) Both products contain chlorine.

D. If Br_2 is used instead of Cl_2, one of product remain same

Answer: A::B::D

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6. In which of the following case disproportionatlon reaction take place.

A. (A) F_2 + Hot water $\rightarrow$ products

B. (B) Cl_2+ Cold and dilute NaOH $\rightarrow$ products

C. (C) Cl_2 + Hot and conc. NaOH $\rightarrow$ products

D. $Cl_2 + NH_3$ (excess) $\rightarrow$ products

Answer: B::C

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7. In which following statement are correct.

(a) Anhydrous hydrogen fluroide is a liquid at ordianry temperature while other halogen acid are gases.

(b) Lead acetate does not form any precipitate with HF acid but other halogen acid from precipitates.

(c) HF is heated with a mixture of MnO_2 and H_2SO_4, no gas is evolved but In case of HCI, HBr and HI acids evolved gases.

(d) HF is not oxidised by strong oxidising agent but other halogen acid are oxidised.

A. (A) a

B. (B) b

C. (C) c

D. d

Answer: A::C::D

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8. A pungent smelling gas X after being dried by concentrated H_2SO_4 was dissolved in water to give strongly acidic solution. The gas also gives dense white fumes with NH_3. X is also a constituent of aqua-regia. Which of the following is/are true for X?

A. (A) X Is HCl

B. (B) X is Cl_2

C. (C) X is the most volatile among the hydrides of halogens

D. Solution of X in water can liberate CO_2 from the solution of sodium hydrogencarbonates.

Answer: A::C::D

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9. Among the following which reactions are possible

A. $F_2 + H_2O \rightarrow HF + O_2$

B. $Cl_2 + H_2O \rightarrow HCl + HClO$

C. $Br_2 + H_2O \rightarrow HBr + HBrO$

D. $I_2 + H_2O \rightarrow HI + HIO$

Answer: A::B::C

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10. Which of the following statements are true:

A. (A) Strength of oxyacids : $HClO_4 > HClO_3 > HClO_2 > HClO$

B. (B) Strength of oxyacids $HClO_4 > HBrO_4 > HIO_4$

C. (C) Number of $p\pi - p\pi$ bonds :

$$HClO_4 > HClO_3 > HClO_2 > HClO$$

D. Percentage s-character of central atom :

$$HClO_4 > HClO_3 > HClO_2 > HClO$$

Answer: A::B::C

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11. Which of the following interhalogen compounds is/are possible:

A. (A)CIF_3

B. (B)lF_5

C. FCl_3

D. BrF_5

Answer: A::B::D

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12. Which of the following statement are true regareding interhalogens:

A. (A) Thermal stability order IF gt BrF gt CIF

B. (B) Hydrolysis of IF_7 produces H_5IO_6 and HF as products.

C. (C) Interhalogen compounds are diamagnetic in nature.

D. IF_7 have pentagonal bipyramidal structure

Answer: A::B::C::D

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13. Which of the following inert gas(es) form(s) clathrate compoud(s) with quinol?

A. (A) Helium

B. (B) Xenon

C. (C) Krypton

D. Neon

Answer: B::C

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14. Consider the following reactions

$$\underset{2}{Xe} + \underset{1}{F_2} \xrightarrow{Ni} A$$

$$\underset{1}{Xe} + \underset{20}{F_2} \rightarrow B$$

$$\underset{1}{Xe} + \underset{5}{F_2} \rightarrow C$$

Select incorrect statements:

A. (A) A, B and C all are non-polar and planner molecule

B. (B) B has no lone pair of electrons

C. (C) The order of Xe-F bond length is A gt C gt B

D. A,B, C are act as lewis base.

Answer: A::B

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15. Which of the following statements(s) is /are true for XeF_6 ?

A. (A) Its partial hydrolysis gives $XeOF_4$.

B. (B) Its reaction With sillica gives $XeOF_4$

C. (C) it is prepared by the reaction of XeF_4 and O_2F_2

D. Its reaction with XeO_3 gives $XeOF_4$

Answer: A::B::C::D

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Exercise 2 Part 4

1. A red liquid (A) when treated with sodium carbonate gives a mixture of two sails (B) and (C) in the solution In which (C) contains oxygen. The mixture then on acidification with sulphuric acid and distillation produces

the red liquid (A) again.

Select the correct statement (or the liquid (A).

A. (A) It acts as an oxidising agent,

B. (B) It is sparingly soluble in water

C. (C) It converts the yellow-dye stuff fluorescein (I) into red colour compound

D. (D) All of these

Answer: D

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2. A red liquid (A) when treated with sodium carbonate gives a mixture of two sails (B) and (C) in the solution In which (C) contains oxygen. The mixture then on acidification with sulphuric acid and distillation produces the red liquid (A) again.

Which of the following statement is false for salt (B)?

A. (A) Its solution in water gives pale yellow precipitate with silver nitrate solution

B. (B) Its solution in water gives white precipitate with lead nitrate solution

C. (C) Its acidified solution (with conc. H_2SO_4) liberates a coloured gas which produces orange red spots on starch paper

D. (D) None

Answer: D

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3. A red liquid (A) when treated with sodium carbonate gives a mixture of two sails (B) and (C) in the solution in which (C) contains oxygen. The mixture then on acidification with sulphuric acid and distillation produces the red liquid (A) again.

Which of the following statement is correct?

A. (A) Liquid (A) undergoes disproportionation reaction in aqueous solution of sodium carbonate

B. (B) The anion of compound (C) has sp^3 hybridisation and is trigonal pyramidal in shape

C. (C) (A) and (B) both

D. (D) None of these

Answer: C

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4. Pseudo halides are anions having resemblance with halide ions. Group I metals can form salts with pseudo halides. Pseudo halogens can acts as ligands and form coordinate complexes. Their hydrides are weakly acidic and can be prepared in analogous way as halogen hydrides are prepared. Azides, cyanides, selonocyanides are example of pseuda halides.

Cyanide, CN^- is a pseudo hafide. When cyanogen is heated with alkali solution, the product are:

A. HCN , H_2O

B. NH_3, $(NH_4)_2CO_3$

C. $NaCN$, $NaOCN$

D. $HCOONa$, NH_3

Answer: C

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5. Pseudo halides are anions having resemblance with halide ions. Group I metals can form salts with pseudo halides. Pseudo halogens can acts as ligands and form coordinate complexes. Their hydrides are weakly acidic and can be prepared in analogous way as halogen hydrides are prepared. Azides, cyanides, selonocyanides are example of pseuda halides.

When NaCN reacts with H_2SO_4, the products are:

A. (A) HCN and Na_2SO_4

B. (B) HCN and $NaHSO_4$

C. (C) $(CN)_2$ and $Na_2SO_4.H_2O$

D. (D) None of these

Answer: A

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6. Pseudo halides are anions having resemblance with halide ions. Group I metals can form salts with pseudo halides. Pseudo halogens can acts as ligands and form coordinate complexes. Their hydrides are weakly acidic and can be prepared in analogous way as halogen hydrides are prepared. Azides, cyanides, selonocyanides are example of pseuda halides.

When sodium pseudo halides are dissolved in water, it resembles with:

A. (A) NaCl

B. (B) NaBr

C. (C) NaF

D. (D) Nal

Answer: C

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7. Pseudo halides are anions having resemblance with halide ions. Group I metals can form salts with pseudo halides. Pseudo halogens can acts as ligands and form coordinate complexes. Their hydrides are weakly acidic and can be prepared in analogous way as halogen hydrides are prepared. Azides, cyanides, selonocyanides are example of pseuda halides.

$(CN)_2$ when react with Na metal, the product is:

A. (A) NaCN

B. Na_2C_2 and N_2

C. NaN_3 and C black

D. $Na(CN)_2^-$

Answer: A

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8. The ionisation energy of dioxygen (O_2) is very close to that of Xenon. Also F and O have the highest electronegativity and consequently can oxidise Xe among rare gases. So Xe forms a large number of compounds with F and O. Xe and F_2 are mixed and reacted at different temperatures to give XeF_2, XeF_4 and XeF_6. Xe also forms an unstable gaseous XeO_4 and soild XeO_3 which Is a very powerful explosive at higher temperatures .Some of the rare gases form clathrates or cage compounds by being entrapped in the cages of cystals laiitice of water, phenol of quinols. Helium can form intersitital compound with transition metals. Bigger members of rare gases do not form such compounds because of their large size.

Xenon from the larges number of compounds only with oxygen and fuorine because:

(i) oxygen and fluorine have very high electronegativity.

(ii) lonisation energy of Xe is the largest among rare gases.

(iii) lonisation energy of Xe is low compared to those of other rare gases.

(iv) low disscoiation energy of fluorine molecule compared to those of CI_2 and Br_2

A. (A) (I) (II) (III)

B. (B) (I), (III), (IV)

C. (C) (III), (IV)

D. (D) (I), (IV)

Answer: B

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9. The ionisation energy of dioxygen (O_2) is very close to that of Xenon. Also F and O have the highest electronegativity and consequently can oxidise Xe among rare gases. So Xe forms a large number of compounds with F and O. Xe and F_2 are mixed and reacted at different temperatures to give XeF_2, XeF_4 and XeF_6. Xe also forms an unstable gaseous XeO_4 and soild XeO_3 which Is a very powerful explosive at higher temperatures .Some of the rare gases form clathrates or cage compounds by being entrapped in the cages of cystals laiitice of water, phenol of quinols. Helium can form intersitital compound with transition

metals. Bigger members of rare gases do not form such compounds because of their large size.

XeF_6 cannot be prepard by the method :

A. $Xe + 3F_2 \xrightarrow[50\ \text{atm}]{475\text{-}532\ \text{K}} XeF_6$

B. $XeF_2 + 2F_2 \xrightarrow{500\ \text{K}} XeF_6$

C. $XeF_4 + F_2 \xrightarrow{475\ \text{K}} XeF_6$

D. $XeO_3 + 6HF \xrightarrow[\Delta]{475\ \text{K}} XeF_6 + 3H_2O$

Answer: D

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10. The ionisation energy of dioxygen (O_2) is very close to that of Xenon. Also F and O have the highest electronegativity and consequently can oxidise Xe among rare gases. So Xe forms a large number of compounds with F and O. Xe and F_2 are mixed and reacted at different temperatures to give XeF_2, XeF_4 and XeF_6. Xe also forms an unstable gaseous XeO_4 and soild XeO_3 which Is a very powerful explosive at higher

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He and Ne do not from any clathrates because :

A. (A) He and Ne are very large in size .

B. (B) Being neutral they cannot from any polar bounds with the host molecules.

C. (C) Being too small , they cannot be entrapped in the cages of water,phenol or quinol.

D. (D) clathrates with He and Ne are highly expolsive.

Answer: C

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11.

Observe the three columns in which column-1 represents Oxy acid, column-2 represents Oxidation State of Cl while column-3 represents facts.

Column-1 (Oxy acid)		Column-2 (Oxidation State of Cl)		Column-3	
(I)	$HClO_2$	(P)	+1	(i)	Chlorine has highest electron affinity
(II)	$HClO_3$	(Q)	+3	(ii)	Fluorine never exhibit oxidation state > 0
(III)	$HClO_4$	(R)	+5	(iii)	HI is strong hydra acid
(IV)	HClO	(S)	+7	(iv)	The decreasing order of thermal stability is IF > BrF > ClF

Which of the following set of combination is correct ?

A. I-(s)-(i)

B. (II)-R-(ii)

C. (III)-Q(iii)

D. (IV)-R-(iv)

Answer: B

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(IV)	HClO	(S)	+7	(iv)	The decreasing order of thermal stability is IF > BrF > ClF

Which of the following set of combination is incorrect ?

A. (I)-Q-(iv)

B. (II)-R-(iii)

C. (III)-P-(ii)

D. (IV)-P-(i)

Answer: C

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13.

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(IV)	HClO	(S)	+7	(iv)	The decreasing order of thermal stability is IF > BrF > ClF

Which of the following set of combination is correct ?

A. (IV)-S-(i)

B. (III)-S-(iii)

C. (II)-Q-(ii)

D. (I)-Q-(iv)

Answer: B

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14.

Observe the three columns in which column-1 represents Compounds, column-2 represents Hybridisation while column-3 represents facts.

Column-1 (Compounds)		Column-2 (Hybridisation)		Column-3	
(I)	XeF_4	(P)	sp^3d^3	(i)	Neon is used in fluorescent bulbs.
(II)	XeF_2	(Q)	sp^3d^2	(ii)	Helium do not form clatharate compounds
(III)	XeF_6	(R)	sp^3d	(iii)	$XeOF_4$ has square pyramidal structure
(IV)	XeO_3	(S)	sp^3	(iv)	Reacts with H_2 produces Xe & HF.

Which of the following set of combination is correct ?

A. (I)-(S)-(iv)

B. (II)-(R)-(iii)

C. (III)-(Q)-(ii)

D. (IV)-(P)-(i)

Answer: B

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Observe the three columns in which column-1 represents Compounds, column-2 represents Hybridisation while column-3 represents facts.

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(IV)	XeO_3	(S)	sp^3	(iv)	Reacts with H_2 produces Xe & HF.

15.

Which of the following set of combination is incorrect ?

A. (IV)-S-(i)

B. (III)-(P)-(ii)

C. (II)-(R)-(iii)

D. (I)-(S)-(iv)

Answer: D

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Observe the three columns in which column-1 represents Compounds, column-2 represents Hybridisation while column-3 represents facts.

Column-1 (Compounds)		Column-2 (Hybridisation)		Column-3	
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(IV)	XeO_3	(S)	sp^3	(iv)	Reacts with H_2 produces Xe & HF.

16.

Which of the following set of combination is correct ?

A. (II)-(Q)-(ii)

B. (III)-(R)-(iii)

C. IV)-(S)-(iv)

D. (I)-(P)-(i)

Answer: C

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Exercise 3 Part 1

1. Give an example of oxidation of halide by another halogen. Explain the feasibility of the reaction.

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2. The set with correct order of acidity is :

A. $HClO < HClO_2 < HClO_3 < HClO_4$

B. $HClO_4 < HClO_3 < HClO_2 < HClO$

C. $HClO < HClO_4 < HClO_3 < HClO_4$

D. $HClO_4 < HClO_2 < HClO_3 < HClO$

Answer: A

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3. The reaction $3ClO^-(aq) \rightarrow ClO_3^-(aq) + 2Cl^-(aq)$ an example of :

A. (A) oxidation reaction

B. (B) reduction reaction

C. (C) disproportionation reaction

D. (D) decomposition reaction

Answer: C

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4. A gas X is passed through water to form a saturated solution. The aqueous solution on treatment with silver nitrate gives a white precipitate. The saturated aqueous solution also dissolves magnesium ribbon with evolution of a colourless gas Y. Identify X and Y.

A. (A) X = CO_2, Y = CI_2

B. (B) X = CI_2, Y = CO_2

C. (C) X = Cl_2, Y = H_2

D. (D) X = H_2, Y = Cl_2

Answer: C

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5. The noble gases have closed-shell electronic configuration and are monoatomic gases under normal conditions. The low boiling points of the lighter noble gases are due to weak dispersion forces between the

atoms and the absence of other Interatomic Interactions.

The direct reaction of xenon with fluorine leads to a series of compounds with oxidation numbers +2,+4 and +6. XeF_4 reacts violently with water to give XeO_3 The compound of xenon exhibit rich stereochemistry and their geometries can be deduced considering the total number of electron pairs in the valence shell.

Argon is used In arc welding because of its:

A. (A) low reactivity with metal

B. (B) ability to lower the melting point of metal

C. (C) flammablity

D. (D) high calorific value

Answer: A

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The structure of XeO_3 is

A. (A) linear

B. (B) planar

C. (C) pyramidal

D. (D) T-shaped

Answer: C

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7. The noble gases have closed-shell electronic configuration and are monoatomic gases under normal conditions. The low boiling points of the lighter noble gases are due to weak dispersion forces between the atoms and the absence of other Interatomic Interactions.

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XeF_4 and XeF_6 are expected to be:

A. (A) oxidizing

B. (B) reducing

C. (C) unreactive

D. (D) strongly basic

Answer: A

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8. All the compounds listed in column I react with water. Match the result of the respective reactions with the appropriate options listed in column II.

Column I	Column II
(A) $(CH_3)_2SiCl_2$	(p) Hydrogen halide formation
(B) XeF_4	(q) Redox reaction
(C) Cl_2	(r) Reacts with glass
(D) VCl_5	(s) Polymerization
	(t) O_2 formation

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9. The reactions of CI_2 gas with cold-dilute and hot-concentrated NaOH in water give sodium salts of two different oxioacids of chlorine, P and Q, respectively. The CI_2 gas reacts with SO_2 gas, in presence of charocal, to give a product R reacts with white phosphorus to give a compound S. On hydrolysis, S gives an oxoacid of phosphorus.

P and Q, respectively, are the sodium salts of

A. (A) hypochlorus and chloric acids

B. (B) hypochlorus and chlorus acids

C. (C) chloric and porchloric acids

D. (D) chloric and hypochlorus acids

Answer: A

Watch Video Solution

10. The reactions of CI_2 gas with cold-dilute and hot-concentrated NaOH in water give sodium salts of two different oxioacids of chlorine, P and Q, respectively. The CI_2 gas reacts with SO_2 gas, in presence of charocal, to give a product R reacts with white phosphorus to give a compound S. On hydrolysis, S gives an oxoacid of phosphorus.

R, S and T, respectively, are

A. SO_2Cl_2, PCl_5 and H_3PO_4

B. SO_2Cl_2, PCl_3 and H_3PO_3

C. $SOCl_2$, PCl_3 and H_3PO_2

D. $SOCl_2$, PCl_5 and H_3PO_5

Answer: A

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11. The unbalanced chemical reactions given In list I show missing reagent or condition (?) Which are provided in List II. Match List I with List II and select the correct answer using the code given below the list:

List-I	List-II
P. $PbO_2 + H_2SO_4 \xrightarrow{?} PbSO_4 + O_2 +$ other product	1. NO
Q. $Na_2S_2O_3 + H_2O \xrightarrow{?} NaHSO_4 +$ other product	2. I_2
R. $N_2H_4 \xrightarrow{?} N_2 +$ other product	3. Warm
S. $XeF_2 \xrightarrow{?} Xe +$ other product	4. Cl_2

A.
P	Q	R	S
4	2	3	1

B.
P	Q	R	S
3	2	1	4

C.
P	Q	R	S
1	4	2	3

D.
P	Q	R	S
3	4	2	1

Answer: D

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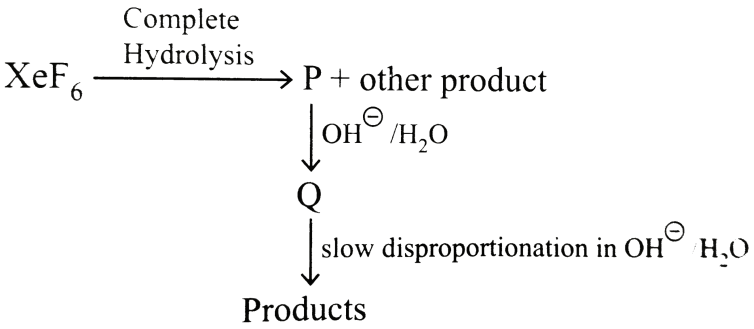
12. Under ambient condition , the total number of gases released products in the final step of the reaction scheme shown below is



A. (A) 0

B. (B) 1

C. (C) 2

D. (D) 3

Answer: C

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Exercise 3 Part 2

1. In case of nitrogen, NCl_3 is possible but not NCl_5 while in case of phosphorous, PCl_5 are possible. It is due to

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

B. (2) lower electronegativily of P then N.

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

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

Answer: A

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2. Concentrated hydrochloric acid when kept in open air sometimes produces a cloud of white fumes. The explanation for it is that :

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

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

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

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

Answer: D

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3. The substance used in holmes singnals of the ship is a mixture of:

A. (1) $CaC_2 + Ca_3P_2$

B. (2) $Ca_3(PO_4)_2 + Pb_3O_4$

C. (3) $H_3PO_4 + CaCl_2$

D. (4) $NH_3 + HOCl$

Answer: A

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4. What happen when a solution of potassium chromate is treated with an excess of dil. Nitic acid?

A. Cr^{3+} and $Cr_2O_7^{2-}$ are formed

B. $Cr_2O_7^{2-}$ and H_2O are formed

C. CrO_4^{2-} is reduced to +3 state of Cr

D. CrO_4^{2-} is oxidized to +7 state of Cr

Answer: B

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5. Which one of the following statements regarding helium is incorrect?

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

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

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

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

Answer: C

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6. Which among the following factors is the most important in making fluorine the strongest oxidizing halogen ?

A. (1) Hydration enthalpy

B. (2) Ionization enthalpy

C. (3) Electron affinity

D. (4) Bond dissociation energy

Answer: A

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

A. (1) HI gt HBrgt HCI gt HF

B. (2) HFgt HCI gt HBrgt HI

C. (3)HCI lt HF lt HBr lt HI

D. (4)Hl gt HCI lt HF lt HBr

Answer: B

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8. Which of the following statements is true?

A. (1) H_3PO_3 is a stronger acid than H_2SO_3

B. (2) In aqueous medium HF is a stronger acid than HCI

C. (3) $HCIO_4$ is a weaker acid than $HCIO_3$

D. (4) HNO_3 is a stronger acid than HNO_2

Answer: D

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9. What products are expected from the desproprtionation reactin of hypochorous acid ?

A. (1) $HCIO_3$ and Cl_2O

B. (2) $HCIO_2$ and $HCIO_4$

C. (3) HCI and CI_2O

D. (4) HCl and $HClO_3$

Answer: D

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10. Identiity the incorrect statement among the following.

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

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

C. (3) Ozone reacts with SO_2 to given SO_3

D. (4) Silicon reacts with NaOH(aq) in the presence of air to give Na_2SiO_3 and H_2O.

Answer: B

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11. Which one of the following reaction of xenon compounds is not Feasible?

A. $3XeF_4 + 6H_2O \rightarrow 2Xe + XeO_3 + 12HF + 1.5O_2$

B. $2XeF_2 + 2H_2O \rightarrow 2Xe + 4HF + O_2$

C. $XeF_6 + RbF \rightarrow Rb[XeF_7]$

D. $XeO_3 + 6HF \rightarrow XeF_6 + 3H_2O$

Answer: D

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12. Which among the following is the most reactive gt

A. Cl_2

B. Br_2

C. I_2

D. I Cl

Answer: D

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13. When chlorine reacts with cold and dilute solution of sodium hydroxide, the products obtained are

A. (1) ClO_2^- and ClO_3^-

B. Cl^- and ClO^-

C. Cl^- and ClO_2^-

D. ClO^- and ClO_3^-

Answer: B

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Exercise 3 Part 3

1. Shapes of certain interhalogen compounds are stated below. Which one of them is not correctly stated?

A. IF_7 :pentagonal bipyramid

B. (2) BrF_5 : trigonal bipyramid

C. (3) BrF_3 : planar T-shaped

D. (4) ICl_3 : planar dimeric

Answer: B

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2. Which of the following xenon-OXO compounds may not be obtained by hydrolysis of xenon fluorides?

A. (1) XeO_2F_2

B. (2) $XeOF_4$

C. (3) XeO_3

D. (4) XeO_4

Answer: D

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3. The least number of oxyacids are formed by:

A. (1) Nitrogen

B. (2) Fluorine

C. (3) Chlorine

D. (4) Sulphur

Answer: B

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4. Chlorine water on standing loses Its colour and forms:

A. (1) HCI only

B. (2) HCI and $HCIO_2$

C. (3) HCI and HOCI

D. (4) HOCI and $HOCl_2$

Answer: C

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5. The non-metal that does not exhibit posittve oxidation state is:

A. (1) Fluorine

B. (2) Oxygen

C. (3) Chlorine

D. (4) Iodine

Answer: A

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6. The following statements concern elements in the periodic table. Which of the following is true ?

A. (1) The Group 13 elements are all metals.

B. (2) All the elements in Group 17 are gases,

C. (3) Elements of Group 16 have lower ionization enthalpy values compared to those of Group 15 in the corresponding periods.

D. (4) For Group 15 elements, the stabity of +5 oxidation state increases down the group.

Answer: C

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7. XeF_6 on partial hydrolysis with water produces a compound 'X'. The same compound 'X' is formed when XeF_6 reacts with silica. The

compound ‘X’ Is:

A. (1)XeO_3

B. (2)XeF_4

C. (3)XeF_2

D. (4)$XeOF_4$

Answer: D

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8. Xenon hexafluoride on partial hydrolysis produces compounds 'X' and 'Y' . Compounds 'X' and 'Y' and the oxidation state of Xe are respectively :

A. $XeOF_4(+6)$ and $XeO_6(+6)$

B. $XeO_2(+4)$ and $XeO_3(+6)$

C. $XeOF_4(+6)$ and $XeO_2F_2(+6)$

D. $XeO_2F_2(+6)$ and $XeO_2(+4)$

Answer: C

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9. Among the following reactoin of hydrogen with halogens, the one that requires a catalyst is

A. $H_2 + F_2 \rightarrow 2HF$

B. $H_2 + Cl_2 \rightarrow 2HCl$

C. $H_2 + I_2 \rightarrow 2HI$

D. $H_2 + Br_2 \rightarrow 2HBr$

Answer: C

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10. Chlorine on reaction with hot and concentrated sodium hydroxide gives:

A. ClO_3^- and ClO_2^-

B. Cl^- and ClO^-

C. Cl^- and ClO_3^-

D. Cl^- and ClO_2^-

Answer: C

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Apsp Part 1

1. The manufacture of fluorine is done by

A. (1) heating anhydrous HF and MnO_2.

B. (2) electrolysis of aqueous HF.

C. (3) electrolysis of anhydrous HF mixed with KHF_2.

D. (4) heating a mixture of KF, MnO_2 and conc. H_2SO_4.

Answer: C

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2. The catalyst used in Deacon's process is :

A. (1) $CuCl_2$

B. (2) Cu

C. (3) $CuSO_4$

D. (4) CuS

Answer: A

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3. Which electrolyte is used in Dennis method for the preparation of fluorine ?

A. (1) KHF_2 solution In anhydrous HF

B. (2) molten cryolite

C. (3) pure dry molten KHF_2

D. (4) none of these

Answer: A

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4. Chlorine is liberated, when we heat

A. (1) $KMnO_4 + NaCI$

B. (2) $K_2Cr_2O_7 + MnO_2$

C. (3) $Pb(NO_3)_2 + MnO_2$

D. (4) $K_2Cr_2O_7 + HCl$

Answer: D

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5. An easy way of obtaining Cl_2 gas in the laboratory is :

A. (1) by heating NaCI and concentrated H_2SO_4.

B. (2) by heating NaCI and concentrated MnO_2.

C. (3) by mixing HCI and $KMnO_4$.

D. (4) by passing F_2 through NaCl solution.

Answer: C

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6. When chlorine reacts with turpentine oil, the product formed is

A. (1) carbon

B. (2) carbon and HCI

C. (3) turpentine chloride

D. (4) none of these

Answer: B

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7. Which of the following does not decolourise iodine?

A. (1) Na_2SO_3

B. (2) $Na_2S_2O_3$

C. (3) NaCl

D. (4) NaOH

Answer: C

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8. In the reaction

$$3Br_2 + 6CO_3^{2-} + 3H_2O \rightarrow 5Br^- + 2BrO_3^- + 6HCO_3^-$$

A. (1) bromine is oxidised and carbonate is reduced

B. (2) bromine is both oxidised and reduced

C. (3) bromine is reduced and wate is oxidised

D. (4) bromine is neither oxidised nor reduced

Answer: B

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9. A greenish yellow gas reacts with an alkin metal hydroxide to form a halate which can be used in fireworks and saftey matches. The gas and the halate are

A. (1) $Br_2, KBrO_3$

B. (2) $Cl_2, KClO_3$

C. (3)l_2, $NalO_3$

D. (4) none

Answer: B

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10. Two gases X and Y bring about bleaching of flowers. X bleaches due to oxidation of dye while Y bleaches by reducing the colouring matter. X and Y are respectively

A. (1) SO_2, Cl_2

B. (2) Cl_2, SO_2

C. SO_2, O_2

D. (4) None of these

Answer: A

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11. Which of the following gases can be dried by conc. H_2SO_4 ?

A. (1) HCI

B. HBr

C. (3) HI

D. (4) H_2S

Answer: A

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12. H_2SO_4 cannot be used for obttaining HBr from KBr because :

A. (1) HBr oxidises H_2SO_4.

B. (2) HBr reduces H_2SO_4

C. (3) HBr undergoes disproportionation

D. (4) KBr reacts very slowly.

Answer: B

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13. Which of the following is the weakest acid?

A. (1) HF

B. (2) HCI

C. (3) HBr

D. (4) HI

Answer: A

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14. Among the following which reaction is not correct:

A. $NaAlO_2 + HCl + H_2O \rightarrow NaCl + Al(OH)_3$

B. $Ca_3N_2 + HCl \rightarrow CaCl_2 + NH_3$

C. $Au + H + NO_3^- + Cl^- \rightarrow AuCl_3^- + NO + H_2O$

D. $Pt + H^+ + NO_3^- + Cl^- \rightarrow PtCl_6^{2-} + NO + H_2O$

Answer: C

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15. Order of boiling point is:

A. (1)HF gt Hl gt HBrgt HCl

B. (2)HFgt HBrgtHI gt HCI

C. (3) HCI gt HBr gt HI gt HF

D. (4) HCI gt HI gt HBr gt HF

Answer: A

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16. Euchlorine is:

A. (1) obtained by heating perchlorate with conc. HCl

B. (2) a chloride of europium

C. (3) a mixture of CI_2 and Cl_2O_7

D. (4) a mixture of Cl_2 and Cl_2O_2

Answer: D

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17. Consider the oxy acids $HClO_n$ series here value of n is 1 to 4. then incorrect statement regarding these oxyacids Is:

A. (1) Acidic chloride of oxy acids increases with increasis n.

B. (2) Oxidising power of oxy acids increases with decreasis n.

C. (3) Thermal stability oxy acids decreases with increasis n.

D. (4) Cl - O bond order decreases with decreasis n.

Answer: C

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18. How many of the following are correctly match:

(1) Cl_2O - (a) yellow-brown gas (bp. $10^\circ C$).

(2) ClO_2 - (b) React with O_3 gives Cl_2O_5 (dark red) it is a mixed anhydride of $HClO_3$ and $HClO_4$.

(3) Cl_2O_7 - (c) It is anhydride of $HCIO_4$ (only).

(4) Cl_2O_7 - (d) Oily explosive colourless liquid.

(5) Cl_2O_7 - (e) has 2 type of O—Cl bond length.

(6) I_2O_5 - (f) Obtained by reaction between l_2 and CO.

A. (1)-(a) , (2)-(b) , (3) -(c) , (4)-(d)

B. (3)-(b) , (4)-(e) , (5) -(d) , (6)-(f)

C. (1)-(b) , (2)-(a) , (3) -(c) , (4)-(d)

D. (2)-(c) , (3)-(b) , (4) -(d) , (5)-(e)

Answer: A

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19. The strongest acid amongst the following is :

A. (1) $HClO_4$

B. (2) $HClO_3$

C. (3) $HClO_2$

D. (4) HClO

Answer: A

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20. Which of the following is not the characteristic of interhalogen compounds?

A. (1) They are more reactive than halogens.

B. (2) They are quite unstable but none of them is explosive.

C. (3) They are covalent in nature.

D. (4) They have low boiling points and are highly volatile.

Answer: D

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21. Which of the following statement is correct.

A. (1) All interhalogen compounds are gaseous at room temperature.

B. (2) Interhalogen are either gaseous or liquid at room temperature.

C. (3) lrterhalogens can solid or liquid or gaseous at room temperature.

D. (4) lnterhalogen compounds are liquid at room temperature.

Answer: C

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22. In which following statement is incorrect:

A. (1) Pseudohalogen ions are not spherical

B. (2) Pseudohalides are generally less electronegative than the lighter halide $\left(F^{-}, Cl^{-}\right)$

C. (3) OCN^{-}, NNN^{-} pseudohalide are bidentate ligands

D. (4) Pseudohalogens from dimers and form molecular compound with non metal and Ionic compounds with alkali metal.

Answer: C

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23. Ionisation energy values are given for Xenon (Xe) and Radon (Rn)

Element	Xe	Rn
IE(KJ/mol)	1169	1036

Predict a suitable reasons for the fact that the chemistry of Rn has not been studied significantly while that of Xe has boon extensively studied.

A. (1) Rn appears to bo more reactive

B. (2) Xe is less reactive than Rn

C. (3) Rn isotopes have shorter lifetimes

D. (4) Rn Is heavior than Xe.

Answer: C

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24. In the clathrates of xenon with water, the nature of bonding between xenon and water molecule is:

A. (1) covalent

B. (2) hydrogen bonding

C. (3) Co-ordinate

D. (4) dipole-Induced dipole interaction

Answer: D

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25. Among noble gases (from He to Xe) only xenon reacts with fluorine to form stable fluorides because xenon :

A. (1) has the largest size.

B. (2) has the lowest ionization enthalpy.

C. (3) has the highest heat of vaporization.

D. (4) Is the most readily available noble gas.

Answer: B

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26. What are the products formed in the reaction of xenon hexafluoride with silicon dioxide?

A. (1) $XeSiO_4 + HF$

B. (2) $XeF_2 + SiF_4$

C. (3)$XeOF_4 + SiF_4$

D. (4)$XeO_3 + SiF_2$

Answer: C

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27. Which of the following are partial hydrolysis gives $XeOF_2$.

A. (1) XeF_2

B. (2) XeF_4

C. (3) XeF_6

D. (4) $XeOF_4$

Answer: B

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28. The ratio of total number of lone pairs in XeF_2 and XeF_4 are:

A. $3:2$

B. $9:14$

C. $14:19$

D. $9:19$

Answer: B

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29. Xenon reacts with $P + F_6$ to form

A. (1) XeF_2

B. (2) $Xe^{+}[P+F_6]^{-}$

C. (3) $Xe^{-}[PtF_6]^{+}$

D. (4) XeF_4

Answer: B

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30. Which among the following statement is incorrect.

A. (1) XeF_4 and SbF_5 combine to form salt.

B. (2) XeF_6 on complete hydrolysis gives XeO_3.

C. (3) XeF_6 react with H_2 produce XeF_2 and HF.

D. (4) Xenon hexaflouride react with silica to form a Xenon compound and this Xenon compound have oxidation of Xenon is +6.

Answer: C

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Apsp Part 2

1. Acid used for making permanent markings on the glass surface is.

A. HNO_3

B. (B) HF

C. (C) HIO_3

D. (D) H_2SO_4

Answer: B

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2. One gas bleaches the colour of flowers by reduction and other by oxidation. These gases are

A. (A) SO_2, CI_2

B. (B) CO, CI_2

C. (C) H_2S, Br_2

D. (D) NH_3, SO_3

Answer: A

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3. Fluorine has -1 oxidation state while iodine exhibits oxidation states of -1, +1, +3 ,+5 and +7. This is due to

A. fluorine being a gas

B. availability of d-orbitals in iodine

C. non-availability of d-orbitals in iodine

D. none of above

Answer: B

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4. Which pseudo-halogen does not have dimeric nature

A. cyanogen

B. azide

C. thiogene

D. selenothigen

Answer: B

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5. The correct sequence of reducing power of halide ions are

A. $Cl^- > Br^- > I^-$

B. $Br^- > I^- > Cl^-$

C. $I^- > Br^- > Cl^-$

D. $Cl^- > I^- > Br^-$

Answer: C

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6. The order of decreasing basicity in the four halide ions is :

A. $I^- > Br^- > Cl^- > F^-$

B. $Cl^- > Br^- > I^- > F$

C. $F^- > Cl^- > Br^- > I^-$

D. $Cl^- > F^- > Br^- > I^-$

Answer: C

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7. Which group of periodic table have large negative energy of activation ?

A. Alkali metal

B. Zero group

C. Halogen family

D. Alkaline earth metal

Answer: C

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8. The compound that cannot be formed by xenon is

A. XeO_3

B. XeF_4

C. $XeCl_4$

D. $XeOF_4$

Answer: C

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9. $K_2S_2O_8$, acidic $K_2S_2O_8$ and acidic MnO_2 oxidise I^-, Br^-, Cl^- to I_2, Br_2 and Cl_2 , respectively. From the given data the sequence that represents the correct order of increasing oxiding ability is

A. $I_2 > K_2S_2O_8 > Br_2$

B. Acidic $MnO_2 > K_2S_2O_8 > Cl_2$

C. $K_2S_2O_8 > I_2 > Br_2$

D. $Cl_2 > K_2S_2O_8 > Br_2$

Answer: D

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10. Hydrogen fluorides is a liquid at room temperature due to

A. dimerisation

B. dissociation followed by aggregation

C. association

D. polymerisation

Answer: C

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11. Which of the following is a "super acid "

A. $(HF + SbF_5)$ in SO_2

B. $(H_2SO_4 + SO_3)$ in SO_2

C. $(HNO_3 + BF_3)$ in SO_2

D. $(H_3PO_4 + PF_5)$ in SO_2

Answer: A

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12. The noble gas was first time discovered by

A. Cavendish

B. Willian ramsay

C. Rayleigh

D. Frankland

Answer: B

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13. Of the interhalogen compounds, CIF_3 is more reactive than BrF_3 , but BrF_3 has higher conductance in the liquid state. The reason is that

A. BrF_3 has higher molecular weight

B. ClF_3 is volatile

C. BrF_3 dissociates into BeF_2^+ and BrF_4^- more easily

D. CIF_3 is most reactive

Answer: C

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14. Radioactive inert gas is :

A. technetium

B. radon

C. xenon

D. curium

Answer: B

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15. The gas which liberates bromine from a solution of KBr is

A. Cl_2

B. I_2

C. SO_2

D. HI

Answer: A

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16. Bleaching powder contains a salt of an oxoacid as one of its components . The anhydride of that acid is

A. Cl_2O

B. Cl_2O_7

C. ClO_2

D. Cl_2O_6

Answer: A

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17. Which of the following hydrogen halides react with $AgNO_3$ to give a precipitate that dissolves in hypo solution ?

(I)HCl (II)HF (III)HI (IV)HBr

A. (III),(I),(II)

B. (I),(III),(IV)

C. (IV),(II),(I)

D. (II),(IV),(III)

Answer: B

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18. With respect to halogens, four statements are given below:

(P) The bond dissociation energies for halogens are in the order: $I_2 < F_2 < Br_2 < Cl_2$.

(Q) The only oxidation state is -1.

(R) The amount of energy rquired for the excitation of electrons to first excited state decrease progressively as we move from F to I.

(S) They form HX_2^- species in their aqueous solutions (X=halogen).

The correct statement are:

A. I,II, IV

B. I,III,IV

C. II,III,IV

D. I,III

Answer: D

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19. Consider a compound $CsXY_2$ where X and Y are halogens. Which of the following statements is /are correct ?

(i)X and Y have different oxidation states.

(ii)For Y with lower atomic number than X, X can assume oxidation states

higher then normal.

(iii)Such compounds exist because Cs^+ has a high charge to size ratio

A. Only (i)

B. (i) and (ii)

C. Only (ii)

D. (i) and (iii)

Answer: B

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20. Iodine is a solid and sublimes at ordinary temperature.This is because of :

A. weak I-I bonds

B. strong I-I bonds

C. lone pair -bond pair repulsions

D. weak van der Waals forces between I_2 molecules.

Answer: D

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21. A 500 mL glass flask is filled at 298 K and 1 atm, pressure with three diatomic gases, X, Y and Z . The initial volume ratio of the gases before mixing was 5:3:1 .The density of the heaviest gas in the mixture is not more than 25 times that of the lighest gas. When the mixture was heated, vigorous reactions take place between X and Y and X and Z in which all the three gases were completely used up. The gases X,Y, Z respectively are

A. H_2, O_2, N_2

B. H_2, O_2, Cl_2

C. H_2, F_2, O_2

D. O_2, H_2, F_2

Answer: C

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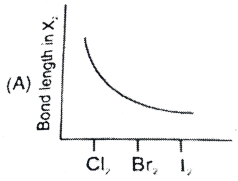
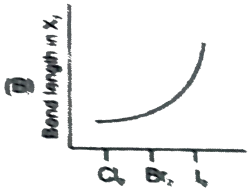
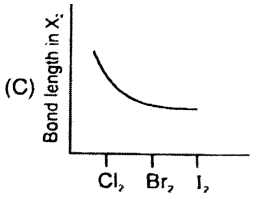
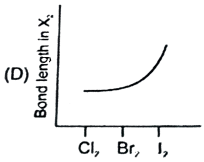
Apsp Part 3

1. Which graph correctly describes a trend found in the halogen group ?

A. 

B. 

C. 

D. 

Answer: B

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2. (i)$(r) + (p) \rightarrow NaClO_2 + O_2$

(ii)$IO_3^- + I^- \xrightarrow{H^+} (q)$

(iii)Acidic solution of $ClO_2^- \rightarrow (s) + (r)$ (disproportionation reaction)

(p)used as air purifier and CO_2 absorber

(q) estimated by hypo and it forms violet colour vapour (it self)

(r)is yellow colour gas

(s) gives chromylchloride test.

which option is correct .

A. (p)=$Na_2O_2, (q) = l_2$

B. $(q) = I_2O_5, (r) = Cl^-$

C. $(p) = Na_2O, (r) = Cl_2O$

D. $(r) = Cl_2, (s) = Cl_2O_3$

Answer: A

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3. $[HXeO_4]^- + OH^- \rightarrow [X] + [Y] + O_2 + H_2O$

The products [X] and [Y] in unbalanced reaction are:

A. $[XeO_6]^{4-} \& Xe$

B. $[XeO_6]^{4-} \& XeO_3$

C. $XeO_3 \& Xe$

D. $H_2XeO_4 \& Xe$

Answer: A

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4. 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.

A. I,II,III

B. II,III,IV

C. I,III,IV

D. All

Answer: B

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5. Which behave like pseudohalide in following

A. $(CN)_2$

B. $(SCN)_2$

C. N_3^-

D. I_3^-

Answer: C

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6. $Cl_2(g) + Ba(OH)_2 \rightarrow X(aq) + BaCl_2 + H_2O$ ltbgt

$X + H_2SO_4 \rightarrow Y + BaSO_4$

$Y \xrightarrow[365\ \mathrm{K}]{\Delta} Z + H_2O + O_2$

Y and Z are respectively :

A. $HClO_4, ClO_2$

B. $HClO_3, ClO_2$

C. $HClO_3, ClO_6$

D. $HClO_4, Cl_2O_7$

Answer: B

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7. Which of the following on treatment with XeF_6 gives Xe ?

A. H_2

B. HCl

C. OH^- (conc)

D. All of these

Answer: D

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8. Which of the following have melting point less than 298 K

A. Fluorine

B. Bromine

C. Iodine

D. Chlorine

Answer: A::B::D

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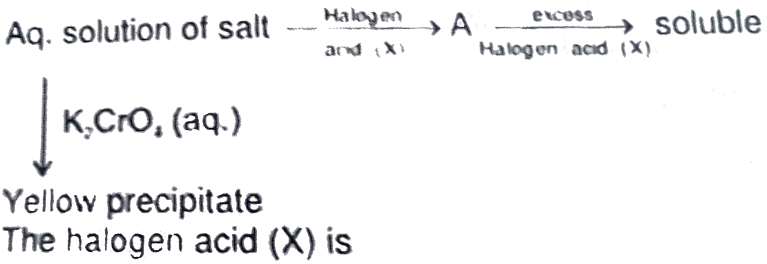
9. 

The halogen acid (X) is

A. HF

B. HCl

C. HI

D. Cl_2 (aq.)

Answer: B::C

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10. Select the correct statement

A. Cl_2O and ClO_2 are used as bleaching agents and as germicides

B. I_2O_5 is used in the quantitative estimation of CO

C. ClO_2 is the anhydride of $HClO_2$ and $HClO_3$

D. Cl_2O is a colourless oily liquid.

Answer: A::B::C

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11. Which of the following are Pseudo halid

A. CN^-

B. N_3^-

C. OCN^-

D. NO_3^-

Answer: A::B::C

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12. Which of the following can be obtained by hydrolysis of XeF_6

A. XeO_3

B. HF

C. XeO_2F_2

D. Xe

Answer: A::B::C

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13. What is the sum of group number and period number (according to IUPAC system) of the non-metal which exist in liquid state at room temperature

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14. How many of the following compounds from HCl on hydrolysis as one of the products (major or minor)

(i)BCl_3 , (ii)$BiCl_3$, (iii)SO_2Cl_2 (iv)NCl_3 (v)PCl_5 (vi)CrO_2Cl_2 (vii)CH_3Cl (viii)NaCl

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15. $NH_4ClO_4 + NHO_3 \rightarrow (A) + (B) \xrightarrow{\Delta} (C)$ (neutral oxide)

The summation of number of lone pairs and atomicities of compound B and C is .

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16. The oxidation state of iodine in compound which is obtained by heating HIO_3 at $170^\circ C$ is +n.

Give value of n

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17. Hydrolysis of compound A , two acids P and Q forms, P is used in etching of glass, Q on strongly heating gives a oxide R. R is used in estimation of carbon monoxide . Calculate total number of lone pairs on compound A .

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18. The simplest ratio x:y of xenon and fluorine when passes through Ni-tube $(400^\circ C)$ at high pressure gives XeF_6. Here x+y is :

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19. White crystalline solid (A) reacts with H_2 to form a highly associated liquid (B) and a monoatomic , colourless gas (C). The liquid (B) is used for etching glass. Compound (A) undergoes hydrolysis slowly to form (C), (B) and a diatomic gas (D) whose IE is almost similar to that of (C). (B) forms

an addition compound with KF to form (E) which is electrolysed in the molten state to form a most reactive gas (F) which combines with (C) in 2:1 ratio of produce (A).

According to Molecular Orbital Theory, which of the following is correct about the molecule (D) ?

A. its bond order is 2.0

B. it has two unpaired electrons in π-bonding M.O.

C. both the above are correct

D. none of these is correct

Answer: A

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20. White crystalline solid (A) reacts with H_2 to form a highly associated liquid (B) and a monoatomic , colourless gas (C). The liquid (B) is used for etching glass. Compound (A) undergoes hydrolysis slowly to form (C), (B) and a diatomic gas (D) whose IE is almost similar to that of (C). (B) forms

an addition compound with KF to form (E) which is electrolysed in the molten state to form a most reactive gas (F) which combines with (C) in 2:1 ratio of produce (A).

Which of the following is correct for the white crystalline solid (A) ?

A. It oxidises F to F_2

B. It on hydrolysis with alkali under goes disproportionation

C. It is obtained by the reaction of (C) with O_2F_2 at $118^\circ C$

D. None of these

Answer: C

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21. White crystalline solid (A) reacts with H_2 to form a highly associated liquid (B) and a monoatomic , colourless gas (C). The liquid (B) is used for etching glass. Compound (A) undergoes hydrolysis slowly to form (C), (B) and a diatomic gas (D) whose IE is almost similar to that of (C). (B) forms an addition compound with KF to form (E) which is electrolysed in the

molten state to form a most reactive gas (F) which combines with (C) in 2:1 ratio of produce (A).

The compound 'A' reacts with sulphur to form a compound in which hybridisation state of sulphur atom is :

A. sp^3d

B. sp^3d^2

C. sp^3

D. sp^3d^3

Answer: B

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22. Match the reaction products listed in column-I with the particulars listed in column-II

	Column–I		Column–II
(A)	$XeF_2 + H_2O \longrightarrow$	(p)	Redox reaction
(B)	$XeF_4 + H_2O \longrightarrow$	(q)	Disproportionation
(C)	$XeF_6 + H_2O \longrightarrow$	(r)	O_2 formation
(D)	$XeO_3 + NaOH \longrightarrow$	(s)	Xe formation
		(t)	Etching glass

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