



CHEMISTRY

JEE (MAIN AND ADVANCED) CHEMISTRY

VI A GROUP ELEMENTS

Examples

1. Write on the electropositivity of iodine.



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2. What is the order of bond enthalpies of halogens?

Why is it not opposite to that of bond lengths?



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3. Chlorine can exhibit -1 and $+1$ states, while fluorine can exhibit only -1 , but not $+1$. Why?



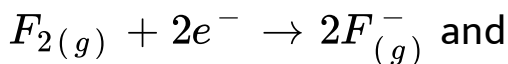
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4. Iodine is violet coloured. Why?



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5. Among the reactions,



$Cl_{2(g)} + 2e^{-} \rightarrow 2Cl_{(g)}^{-}$ which is more feasible ? Give the reason.



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6. Standard reduction potential (SRP) of fluorine is highest. Comment



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7. Electron gain enthalpy of fluorine is less than that of chlorine - explain.

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8. Bond enthalpy of bromine is 194 kJ mol^{-1} . If enthalpy of vapourisation of Br_2 is $+30 \text{ kJ mol}^{-1}$, electron gain enthalpy of Br is -325 kJ mol^{-1} and hydration enthalpy of bromide is -339 kJ mol^{-1} calculate the change in enthalpy for the reaction,

$$\frac{1}{2} \text{Br}_2(l) + e^- \xrightarrow{aq} \text{Br}^-(aq).$$

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9. Heavier halide is oxidised by lighter halogen. Justify.



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10. Electrolysis of aqueous HF produces O_2 at anode but not F_2 Explain.



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11. Analyse the bonds present in KHF_2



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12. What is the action of litmus with aqueous chlorine?



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13. What kind of reaction that chlorine undergoes with aqueous alkali solution ?



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14. Cl_2 is more reactive than I_2 but when $KClO_3$ reacts with I_2 , Cl_2 is liberated. Why?



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15. When HCl reacts with powdered iron, ferrous chloride is formed, but not ferric chloride. Why?



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16. What happens when some ethyl alcohol is added in the Nelson's cell and the cell is closed ?



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17. Chlorine trioxide is paramagnetic, but chlorine hexoxide is diamagnetic. Explain.



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18. Hypochlorite is a strong oxidant and bleaching agent. Why?



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19. Perchloric acid is strongest acid, but weakest oxidising agent. Why?



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Subjective Exercise 1 Long Answer Questions

1. Discuss the following trends in halogens.

(a) atomic radius

(b) ionisation potential

(c) electron affinity and

(d) electronegativity.



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2. Discuss on the oxidation ability of halogens.



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3. What are interhalogen compounds ? Do all these interhalogen compounds have halogens in the same hybridized state ? Write the structures of all the interhalogen compounds.



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Subjective Exercise 1 Short Answer Questions

1. Discuss the electronic configuration of halogens.



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2. Write on the occurrence and important minerals of halogens

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3. Write on the bonding and oxidation states of halogens.

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4. How does halogens react with (a) water (b) alkali and (c) metals

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5. Discuss the reactivity of halogens with hydrogen.



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6. Write a note on bonding and structures of interhalogen compounds.



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7. Explain the oxidation states of chlorine with respect to its electronic configuration



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8. Name the hybridizations occurring in the interhalogen compounds.



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9. Write the names of all the VIIA group elements.



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10. Mention the most electronegative element in the periodic table. What is the electronegativity value of fluorine ?



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11. Name the element with highest electron affinity and give its value.

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12. Why is the electron affinity of chlorine greater than that of fluorine ?

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Subjective Exercise 2 Short Answer Questions

1. Write the examples denoting anomalous behaviour of fluorine



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Subjective Exercise 2 Very Short Answer Questions

1. Compare the bond energy of fluorine with that of other halogens.



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2. Fluorine exhibits only - 1 oxidation state in its compounds. Why?



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3. Rectivity of fluorine with water is different from that of other halogens. Substantiate.



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4. Write two factors supporting anomalous behaviour of fluorine.



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5. Write the distinction between fluorine and rest of the halogens.



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Subjective Exercise 3 Long Answer Questions

1. Describe the Nelson's cell method for the preparation of chlorine.



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2. Write the general chemical properties of chlorine.

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Subjective Exercise 3 Short Answer Questions

1. How does chlorine react with hydrocarbons ? Write the necessary chemical equations.

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2. Mention the important uses of chlorine

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3. How hydrogen chloride is prepared in the laboratory ?

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4. Discuss the acidic character of HCl. How does it decompose salts of weaker acids ?

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Subjective Exercise 3 Very Short Answer Questions

1. Write the electrode reactions in Nelson's cell.

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2. When does Cl_2 react with CO ? Give the equation.

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3. Write the balanced equation(s) for the reaction of Cl_2 with NH_3 .

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4. One mole of NH_3 is mixed with 8 moles of Cl_2 in a reaction vessel. Write the equation.

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5. How does chlorine react with hypo ?

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Subjective Exercise 4 Long Answer Questions

1. Write various oxyacids of chlorine. Write the oxidation numbers of chlorine in these Oxyacids.

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Subjective Exercise 4 Short Answer Questions

1. Mention different oxyacids of halogens. Discuss their acidic nature.



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2. Discuss the structures of oxyanions of chlorine. Compare the O-Cl bond lengths and bond energies



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Subjective Exercise 4 Very Short Answer Questions

1. What is the structure of HClO_4 ?



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2. Give hybridisation of chlorine lone pairs on chlorine in chloric acid.



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3. Which oxyacids of chlorine is strongest ? . Why?



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Objective Exercise 1 General Characteristics

1. The number of unpaired electrons present in the first excited state of chlorine atom is

A. 1

B. 2

C. 5

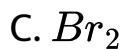
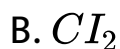
D. 2

Answer: B



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2. Which of the following halogens has metallic character ?



Answer: D



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3. Super halogen is

A. F_2

B. Cl_2

C. Br_2

D. I_2

Answer: A



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4. The element which never acts as reducing agent in a chemical reaction is

A. O

B. Li

C. F

D. C

Answer: C



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5. The high reactivity of fluorine is mainly due to

A. high heat of hydration

B. small size

C. low bond dissociation energy of the F-F bond

D. high ionisation potential

Answer: C



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6. The type of forces present among halogen molecules

A. H-bonds

B. Covalent bonds

C. Vander waal's forces

D. Ionic bond

Answer: C



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7. The correct order of Vander Waals radius of F, Cl and Br is :

A. $Cl > F > Br$

B. $Br > Cl > F$

C. $F > Cl > Br$

D. $Br > F > Cl$

Answer: B



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8. Liquid and solid halogens are

A. Br_2 and Cl_2

B. I_2 and Br_2

C. Br_2 and I_2

D. Cl_2 and I_2

Answer: C



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9. The halogen that undergoes sublimation is

A. F_2

B. Cl_2

C. Br_2

D. I_2

Answer: D



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10. Ionisation potential of fluorine is abnormally high. It is due to

- A. Its high EN value
- B. Its high EA value
- C. Its small size
- D. Its big size

Answer: C



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11. The elements with the highest electron affinity and electronegativity respectively are

A. Cl and Cl

B. F and F

C. F and Cl

D. Cl and F

Answer: D



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12. An element M has an atomic mass 19 and atomic number 9. Its ion is represented by



Answer: C



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13. General oxidation states of halogens are

A. $-1, +1$

B. $-1, +1, +3$

C. $-1, +1, +3, +5$

D. $-1, +1, +3, +5, 7$

Answer: D



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14. Which one of the following elements can show both positive and negative oxidation state ?

A. F

B. I

C. Li

D. He

Answer: B



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15. The maximum oxidation state that can be exhibited by a halogen in its second excited state

A. +1

B. +3

C. +5

D. +7

Answer: C



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16. Which one of the following elements show different oxidation states?

A. Sodium

B. Fluorine

C. Chlorine

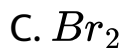
D. Potassium

Answer: C



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17. Enthalpy of dissociation is low for



Answer: D



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18. F_2 absorbs portion of light and appear yellow and I_2 absorbs portion of light and appears violet

- A. Red and Green
- B. Violet and Yellow
- C. Blue and Orange
- D. Green and Red

Answer: B



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19. In AX_3 type of molecule if 'A' undergoes sp^3d^2 hybridisation, then the shape of the molecule is

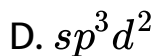
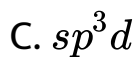
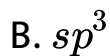
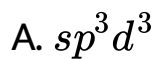
- A. T-shape
- B. Octahedral
- C. Square pyramidal
- D. Tetrahedral

Answer: C



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20. The hybridization in interhalogen compound AX_7 is

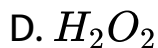


Answer: A



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21. The strongest oxidising agent among the following is

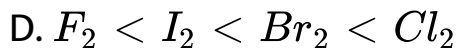
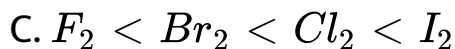
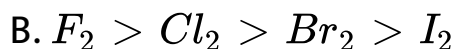
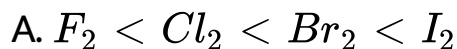


Answer: B



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22. The order of reactivity of halogens with Hydrogen is

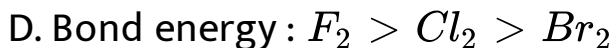
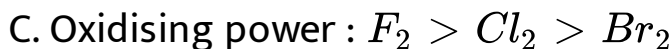
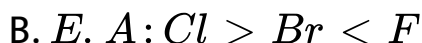
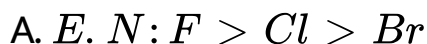


Answer: B



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23. Which of the following is incorrect with respect to property indicated ?



Answer: D



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24. Which halogen has highest ionisation potential

A. Fluorine

B. Chlorine

C. Bromine

D. Iodine

Answer: A



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25. The electron affinity values (in $KJ\text{mole}^{-1}$) of three halogens x , y and z are respectively -349 , -333 and -325 . Then x , y and z respectively are

A. F , Cl and Br

B. Cl , F and Br

C. Cl , Br and F

D. Br , Cl and F

Answer: B



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26. Which of the following is most volatile

A. HI

B. HBr

C. HCl

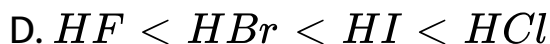
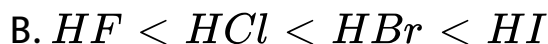
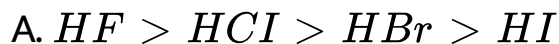
D. HF

Answer: C



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27. Correct order of boiling points of hydrogen halides is



Answer: C



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28. One gas bleaches the colour of flowers by reduction and another gas by oxidation. The gases respectively are

A. SO_2 and Cl_2

B. CO and Cl_2

C. NH_3 and SO_2

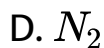
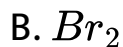
D. H_2S and Br_2

Answer: A



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29. In the reaction $2Br^- + X_2 \rightarrow Br_2 + 2X^-$, X_2 is



Answer: A



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30. Which of the following has greatest reducing power ?

A. HI

B. HBr

C. HCl

D. HF

Answer: A



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31. Mark the element which shows only one oxidation state in its compounds

A. F

B. Cl

C. Br

D. I

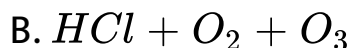
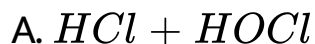
Answer: A



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Objective Exercise 1 Chlorine

1. Cl_2 reacts with water and forms



Answer: A



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

- A. Dry air
- B. Moisture
- C. Sun light
- D. None of these

Answer: B



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3. Cl_2 (or) Br_2 (or) I_2 reacts with cold and dilute alkali solution to form

- A. Halide + Hypohalite
- B. Halide + Hypohalite + H_2O

C. Halide + halite

D. Halide + Halate + H_2O

Answer: B



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4. Cl_2 (or) Br_2 (or) I_2 reacts with hot conc. Alkali solution to form

A. Halide + Hypohalite

B. Halide + Hypohalite + H_2O

C. Halide + halite

D. Halide + Halate + H_2O

Answer: D



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5. The following is not a mineral of Chlorine

A. Carnalite

B. Horn silver

C. Sylvine

D. Cryolite

Answer: D



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6. When Brine solution is subjected to electrolysis the gases liberated at anode and at cathode are

A. H_2 and Cl_2

B. H_2 and O_2

C. Cl_2 and O_2

D. Cl_2 and H_2

Answer: D



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7. At ordinary temperature Cl_2 reacts with

A. O_2

B. N_2

C. He

D. Cu

Answer: D



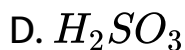
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8. Chlorine oxidises H_2S to

A. S

B. SO_2

C. H_2SO_4

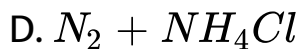
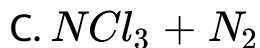
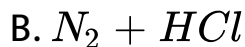
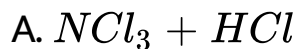


Answer: A



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9. The products formed when Cl_2 reacts with excess of NH_3 are



Answer: D



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10. What are the products formed when ammonia reacts with excess chlorine ?

A. N_2 and NCl_3

B. N_2 and HCl

C. N_2 and NH_4Cl

D. NCl_3 and HCl

Answer: D



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11. In the use of Cl_2 as bleaching agent, the substance that is mainly responsible for the bleaching is

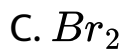
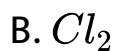


Answer: D



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12. Which of the following is used in the extraction of gold



Answer: B



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13. Which one of the following is formed apart from sodium chloride when chlorine reacts with hot concentrated sodium hydroxide?



Answer: C



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1. Cl in ClO^- undergoes hybridisation

A. sp^2

B. sp^3

C. sp^3d

D. sp^3d^2

Answer: B



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2. What is the oxidation state of chlorine in hypochlorous acid?

A. +7

B. +5

C. +3

D. +1

Answer: D



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3. Which of the following is not a peroxy acid?

A. Perphosphoric Acid

B. Pernitric Acid

C. Perdisulphuric Acid

D. perchloric acid

Answer: D



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4. The geometry of ClO_3^- according to valence shell electron pair repulsion theory will be

A. Planar triangle

B. Pyramidal

C. Tetrahedral

D. Square planer.

Answer: B



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5. What is the bond angle in $ClO_2(OCIO)$?

A. $109^{\circ} 28^1$

B. 111°

C. 118°

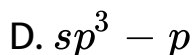
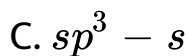
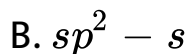
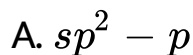
D. 115°

Answer: B



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6. Sigma bond between Cl and O in ClO_4^- is formed by --- overlapping



Answer: D



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7. Shape and bond angle in ClO_4^- ion is

A. planar trigonal , $109^{\circ}28^1$

B. tetrahedral , $109^{\circ}28^1$

C. pyramidal 105°

D. v-shape , 118°

Answer: B



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8. The number of a bonds in ClO_4^- ion is

A. 2

B. 3

C. 4

D. 1

Answer: B



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9. The number of lone pairs on Chlorine atom in ClO^- , ClO_2^- , ClO_3^- , ClO_4^- ions are

A. 0, 1, 2, 3

B. 1, 2, 3, 4

C. 4, 3, 2, 1

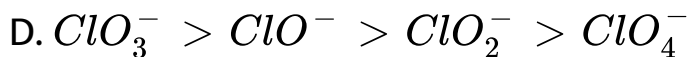
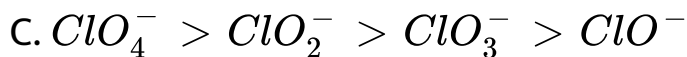
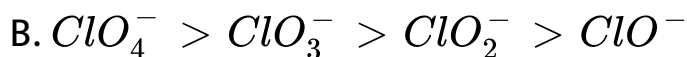
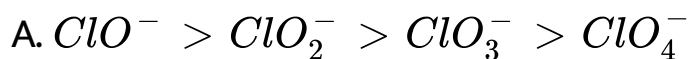
D. 3, 2, 1, 0

Answer: D



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10. The order of $Cl - O$ bond energy in ClO^- , ClO_2^- , ClO_3^- , ClO_4^- is



Answer: B



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Objective Exercise 1 Assertion And Reason Type

1. (A): The bond dissociation energy of fluorine is less than bromine.

(R): In fluorine molecule, large lone pair electronic repulsions and appreciable internuclear repulsions are present.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

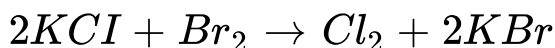
D. A is false, R is true

Answer: A



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2. (A): Reaction given below is possible



(R): lighter halogen displaces larger halogen from its metal halides .

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: D



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3. (A): Electron affinity of fluorine is lower than that of chlorine

(R): Fluorine has small and compact size and stronger inter electron repulsion than chlorine.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A



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4. (A): $Cl - O$ bond length decreases from ClO^- to ClO_4^-

(R): $Cl - O$ bond order increases from ClO^- to ClO_4^- .

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A



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5. (A): Bromine does not displace chlorine from its salt solution

(R): Chlorine is displaced from its oxysalt by bromine

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: B



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6. (A) : Iodine is the only halogen that is naturally available in positive oxidation states

(R): Iodine is slightly electropositive among halogens .

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A



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7. (A) : Chlorine acts as a bleaching agent in the presence of moisture

(R) : Chlorine forms hypochlorous acid in the presence of moisture.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A



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8. (A): HBr is stronger acid than HI.

(R) : Bromine is more electronegative than iodine.

A. Both A & R are true, R is the correct explanation

of A

B. Both A & R are true, R is not correct explanation

of A

C. A is true, R is false

D. A is false, R is true

Answer: D



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9. (A): Iodine displaces bromine from $KBrO_3$

(R): Iodine is strong oxidizing agent than bromine.

A. Both A & R are true, R is the correct explanation

of A

B. Both A & R are true, R is not correct explanation

of A

C. A is true, R is false

D. A is false, R is true

Answer: C



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10. (A) OX^- on heating in the presence of OH^- gives X^- and XO_3^- ($X = Cl, Br, I, \dots$)

(R) Conversion of OX^- to X and XO_3^- is called disproportionation

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: B



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11. (A) : Chlorine is gas, bromine is liquid and iodine is solid

(R) : Intermolecular attraction forces increase upon increase in molecular masses .

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A



Watch Video Solution

12. (A): Hydrogen iodide is most stable among hydrogen halides

(R): Iodide is most powerful reductant among halides.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: D



Watch Video Solution

13. (A): Oxidation ability increases from $HOCl$ to $HClO_4$

(R): Oxidation number of chlorine increases from HOCl to HClO_4 .

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: D



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14. (A): Fluorine does not form oxyacids

(R): Electronegativity of fluorine is higher than that of oxygen.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A



Watch Video Solution

15. (A): Iodine appears in violet colour.

(R): Iodine absorbs violet part of electro magnetic radiation .

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: C



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16. (A) :Among hydrogen halides, hydrogen fluoride is least volatile.

(R): Hydrogen fluoride molecules are associated with hydrogen bonding.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A



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Objective Exercise 2 General Characteristics

1. The electronic configuration of an element is $1s^2 2s^2 2p^5$. It is most likely to form

- A. Anion only
- B. Cation only
- C. Either cation or anion
- D. Neither cation nor anion

Answer: A



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2. Chlorine atom, in its third excited state, reacts with fluorine to form compound X. The formula and shape of X are

- A. ClF_5 , Pentagonal
- B. ClF_4 , Tetrahedral
- C. ClF_4 , Pentagonal bipyramidal
- D. ClF_7 , Pentagonal bipyramidal

Answer: D



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3. Give examples and suggest reasons for the following features of the transition metals.

The highest oxidation state is exhibited in oxoanions of a metal.

A. -1

B. $+1$

C. 0

D. $+2$

Answer: C



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4. When halogen (except F_2) is passed through alkali in different conditions, the halogen undergoes

- A. oxidation only
- B. Reduction only
- C. Both oxidant and reductant
- D. neither oxidation nor reduction

Answer: C



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5. The gases liberated during the electrolysis of aqueous solution of hydrogen fluoride

A. H_2 and O_2

B. H_2 and F_2

C. O_2 and F_2

D. can not be electrolysed

Answer: A



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6.

List I

Property

(A) M.Pts

(B) B.Pts

(C) Electron affinity

(D) Bond dissociation energy

List II

Order

(1) $I_2 < Br_2 < F_2 < Cl_2$

(2) $Cl > F > Br > I$

(3) $Cl_2 > Br_2 > F_2 > I_2$

(4) $F_2 > Cl_2 > I_2 > Br_2$

The correct match is

A.

| <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> |
|----------|----------|----------|----------|
| 5 | 5 | 2 | 3 |

B.

| <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> |
|----------|----------|----------|----------|
| 2 | 5 | 3 | 4 |

C.

| <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> |
|----------|----------|----------|----------|
| 1 | 2 | 3 | 4 |

D.

| <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> |
|----------|----------|----------|----------|
| 5 | 2 | 3 | 4 |

Answer: A



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7. Which of the following statements about halogens is correct?

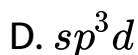
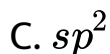
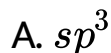
- A. All are diatomic and forms univalent ion
- B. All are capable of exhibiting several oxidation states
- C. All are diatomic and form divalent ions
- D. They can mutually displace each other from the solution of their compounds with metals

Answer: A



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8. Sulphur reacts with chlorine in 1 : 2 ratio and forms X. Hydrolysis of X gives a sulphur compound Y. What is the hybridisation state of central atom in the anion of Y ?



Answer: A



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9. In which of the following molecules, sigma bonds formed by the overlap of sp^3d and P orbitals are absent ?

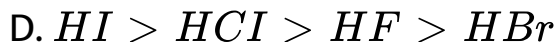
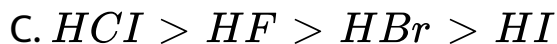
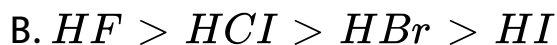
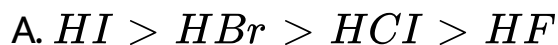


Answer: D



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

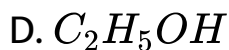
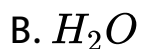


Answer: B



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11. Hydrogen bonding does not play any role in boiling of



Answer: C



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12. Bond dissociation energies of HF, HCl, HBr follow the order



Answer: C



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13. Hydrolysis of NCl_3 gives NH_3 and X. which of the following is X?

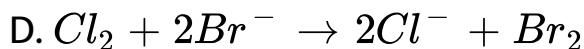
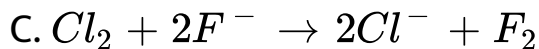
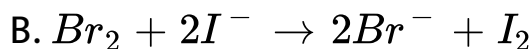
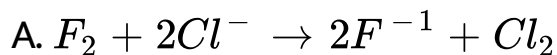


Answer: C



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14. Which of the following reaction does not takes place.



Answer: C



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15. Which of the following shows variation of bond energy (BE) of halogens

A. 

B. 

C. 

D. 

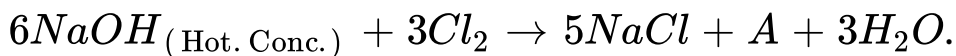
Answer: A



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Objective Exercise 2 Chlorine

1. Consider the following reaction



What is the oxidation number of chlorine in "A"?

A. +5

B. -1

C. +3

D. +1

Answer: A



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2. When Cl_2 reacts with Fe (or) Cu it does not form

A. $FeCl_2$

B. $CuCl$

C. $FeCl_3$ and $CuCl_2$

D. $FeCl_2$ and $CuCl$

Answer: D



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3. Chlorine is passed into dilute, cold KOH solution.

What are the oxidation numbers of chlorine in the products formed ?

A. 1 and + 5

B. -1 and $+3$

C. $+1$ and $+7$

D. $+1$ and -1

Answer: D



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4. The compound in which the number of $d\pi - p\pi$ bonds are equal to those present in ClO_4^-

A. XeF_4

B. XeO_3

C. XeO_4

D. XeF_6

Answer: B



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5. Which of the following dissolves in water but does not give any oxyacid solution?

A. SO_2

B. OF_2

C. SCl_4

D. SO_3

Answer: B



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6. Oxyacid of chlorine with $+5$ state of the central atom is

A. hypochlorous acid

B. chlorous acid

C. chloric acid

D. perchloric acid

Answer: C



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7. Which one of the following pairs of reactants does not form oxygen when they react with each other?

A. F_2 , $NaOH$ solution (hot, conc)

B. F_2 , H_2O

C. Cl_2 , $NaOH$ solution (cold, dilute)

D. $CaOCl_2$, H_2SO_4 (dilute, small amount)

Answer: C



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8. *OCIO* bond angle in ClO_2^- is

A. 111°

B. 109.5°

C. 106°

D. 104.5°

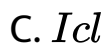
Answer: A



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Objective Exercise 2 Interhalogen Compounds

1. Which of the following inter-halogen compounds does not exist ?



Answer: D



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2. Halogens combine among themselves to form covalent compounds which are called

- A. Pseudohalides
- B. Interhalogen compounds
- C. Polyhalides
- D. None of these

Answer: B



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3. The halogen forming largest number of inter-halogens is

A. F

B. Cl

C. Br

D. I

Answer: A



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Practice Exercise

1. Fluorine does not exhibit positive oxidation states because

- A. it is the most electronegative element
- B. of absence of d-orbitals in its valency shell
- C. it is the element with highest EA
- D. of it's high ionisation energy

Answer: A



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2. When I_2 is passed through KCl , KF and KBr solutions

A. Cl_2 and Br_2 are evolved

B. Cl_2 , Br_2 and F_2 are evolved

C. Cl_2 is evolved

D. None of these

Answer: D



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3. Oxidation of thiosulphate with iodine gives

A. Sulphate ion

B. Sulphite ion

C. Tetrathionate

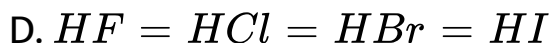
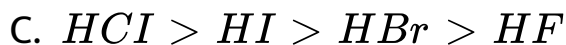
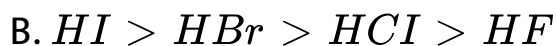
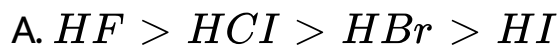
D. Sulphide ion.

Answer: C



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4. The order of acidic character of hydrogen halides is

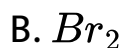


Answer: B



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5. Which of the following can be prepared only by electrolysis



Answer: C



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6. The ionic radius of Br^{-1} is $1.96A^{\circ}$ and the ionic radius of I^{-1} will be

A. $2.20A^{\circ}$

B. $1.96A^{\circ}$

C. $1.84A^{\circ}$

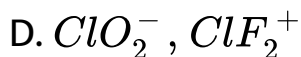
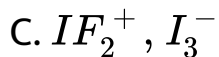
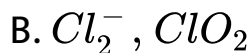
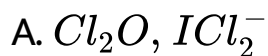
D. $1.33A^{\circ}$

Answer: A



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7. The isoelectronic pair is



Answer: D



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8. The halogen having Greenish - yellow gas reacts with hot and concentrated NaOH solution, and give products. The oxidation state of that halogen changes from

A. $0 \rightarrow -1$

B. $0 \rightarrow +5$

C. -1 and $+1$

D. $0 \rightarrow '' - 1''$ and $'' + 5''$

Answer: D

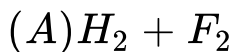


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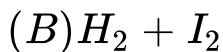
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List I

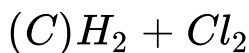
List II



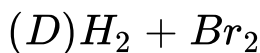
(1) Slow in dark but fast in sun light
sun light



(2) Does not take place at
room temp. but takes
place at 593 K in hv



(3) fast in dark but slow in
sunlight



(4) Takes place even in the
dark (21 - 23k)

(5) Pt, 713 K and reversible

the correct match is

A.

| | | | |
|----------|----------|----------|----------|
| <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> |
| 4 | 5 | 1 | 2 |

B.

| | | | |
|----------|----------|----------|----------|
| <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> |
| 4 | 5 | 2 | 1 |

C.

| | | | |
|----------|----------|----------|----------|
| <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> |
| 1 | 2 | 3 | 4 |

D.

| | | | |
|----------|----------|----------|----------|
| <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> |
| 2 | 1 | 5 | 4 |

Answer: A



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10. Which of the following has highest hydration energy ?



Answer: D



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11. The SRP for the different halogens is in the order of

A. $F > Cl > Br > I$

B. $F < Cl < Br < I$

C. $F < Cl > Br > I$

D. $F = Cl = Br = I$

Answer: A



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12. Which of the following shows variation of electron gain enthalpy values (on y-axis) of halogens

A. 

B. 

C. 

D. 

Answer: B



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13. The purpose of addition of KF to HF in the preparation of Fluorine by electrolysis is

- A. to increase the conductance of HF
- B. to decrease the oxidation potential of HF
- C. to lower the solubility of HF
- D. to increase the melting point of HF

Answer: A



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14. The bond not present in KHF_2 is

A. hydrogen

B. Dative

C. Ionic

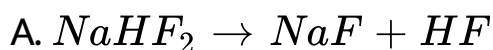
D. Covalent

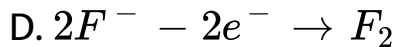
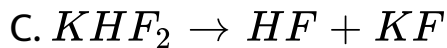
Answer: B



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15. The F_2 liberated at the anode in the whytlaw Gray method is passed through U - tube, then the following reaction takes place

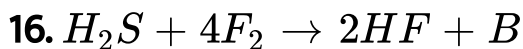




Answer: B



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The shape of molecule of compound B is

A. Octahedral

B. Tetrahedral

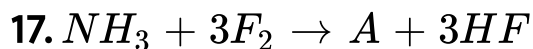
C. Trigonal planar

D. linear

Answer: A



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The correct statement regarding A is

A. sp^3 , Tetrahedral, no lone pair

B. sp^3 , Pyramidal, one lone pair

C. sp , linear, no lone pair

D. sp^3 , angular, two lone pairs

Answer: B



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18. $4HCl + A \rightarrow MnCl_2 + Cl_2 \uparrow + 2H_2O$, In this reaction the change in oxidation state of metal present in A is

A. 2 to -2

B. $+4$ to $+6$

C. -1 to $+3$

D. $+4$ to $+2$

Answer: D



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19. Bond angles in Cl_2O and ClO_2 , are

A. 118° , 120°

B. $109^\circ 28'$, 111°

C. 111° , 118°

D. 115° , 120°

Answer: C



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20. In the reaction of Cl_2 with Na_2SO_3 , chlorine acts as

- A. Reductant
- B. Oxidant
- C. Both oxidant and reductant
- D. Neither oxidant nor reductant

Answer: B



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21. In the known interhalogen compound the maximum number of halogen atoms is

A. 4

B. 5

C. 7

D. 8

Answer: D



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22. 50g of a good sample of $CaOCl_2$, is made to react with CO_2 . The volume of Cl_2 liberated at S.T.P is

A. 5.6 lit

B. 11.2 lit

C. 22.4 li

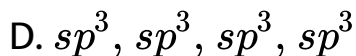
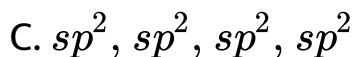
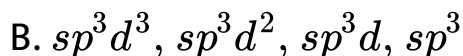
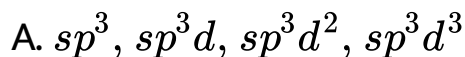
D. 4.48 lit

Answer: A



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23. The hybridisation of chlorine in ClO^- , ClO_2 , ClO_3^- , and ClO_4^- ions are



Answer: D



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24. $Cl-O$ bond length is 170 pm in the oxyanion

A. Hypochlorite

B. chlorite

C. chlorate

D. Perchlorate

Answer: A



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25. Which of the following form inter-halogen compounds ?

A. F

B. Cl

C. Br

D. All of these

Answer: D



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26. The electronic state of chlorine in one of the excited states is $3s^2 3p^3 2d^2$. With this state the interhalogen compound formed is

A. ICl

B. ClF_3

C. $BrCl_5$

D. IF_7

Answer: C



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27. Chloroform is prepared by the use of bleaching powder. The organic compound taken is

A) C_2H_5OH

B) CH_3CHO

C) CH_3COOH

D) CH_3COOH

A. A,B,C

B. B,C,D

C. A,C,D

D. A,B,D

Answer: A



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28. In the formation of XA_5 type interhalogen compound, X undergoes

A. sp^3 , hybridisation

B. sp^3d , hybridisation

C. dsp^2 , hybridisation

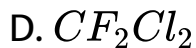
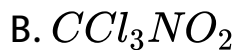
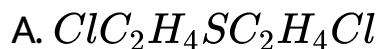
D. sp^3d^2 , hybridisation

Answer: D



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29. The composition of tear gas is

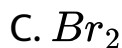


Answer: B



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30. Which one of the following can be purified by sublimation ?



Answer: D



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31. Number of delocalised π electrons present in perchlorate anion is

A. 8

B. 6

C. 4

D. 2

Answer: B



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32. Halogen that is naturally available even in positive oxidation states is

A. Fluorine

B. Chlorine

C. Bromine

D. Iodine

Answer: D



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33. As the atomic number of halogens increases down the group, the halogens

- A. Lose the outermost electrons more readily
- B. Become lighter in colour
- C. Become less denser
- D. Gain electrons more readily

Answer: A



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34. The type of bonding in HCl molecule is

A. Pure covalent

B. Polar covalent

C. Highly polar .

D. H-bonding

Answer: B



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35. Which of the following molecule form hydrogen bond even in the vapour state also

A. NO_2

B. H_2O

C. HF

D. $C_2H_5NH_2$

Answer: C



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36. Which of the following properties does not correspond to the order given below: $HI < HBr < HCl$

A. Thermal stability

B. Reducing power

C. Ionic character

D. Dipole moment

Answer: B



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37. Which acid can combine with its own salt again

A. HF

B. HBr

C. HCl

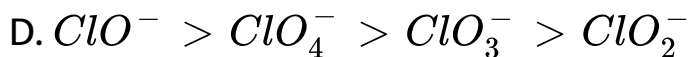
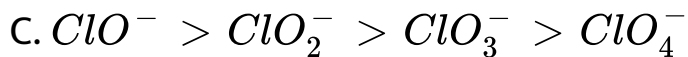
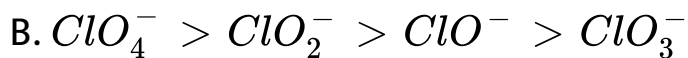
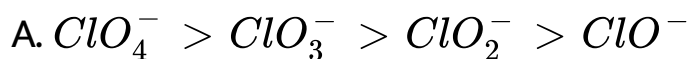
D. HI

Answer: A



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38. The order of basic strength of ClO^- , ClO_2^- , ClO_3^- , ClO_4^- is



Answer: C



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39. Cl_2O_6 is the mixed anhydride of

A. HOCl and HClO_2

B. HClO_2 and HClO_3

C. HClO_3 and HClO_4

D. HClO and HClO_3

Answer: C



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40. Which one of the following is most unstable

A. BrF

B. ClF

C. BrCl

D. IF

Answer: D



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41. Cl_2O is the anhydride of

A. $HOCl$

B. $HClO_2$ and $HClO_3$

C. $HClO_3$ and $HClO_4$

D. $HClO_4$

Answer: A



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42. Hybridisation of the central atom in Cl_2O molecule is

A. sp^2

B. sp^3

C. sp^3d

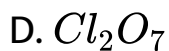
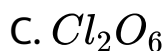
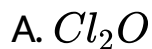
D. sp^3d^2

Answer: B



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43. The anhydride of perchloric acid is



Answer: D



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44. In Cl_2O_7 each chlorine atom is linked to

A. four oxygen atoms

B. three oxygen atoms

C. two oxygen atoms

D. five oxygen atoms

Answer: A



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45. $4HCl + A \rightarrow MnCl_2 + Cl_2 \uparrow + 2H_2O$, In this reaction the change in oxidation state of metal present in A is

A. 2 to -2

B. $+4$ to $+6$

C. -1 to $+3$

D. $+4$ to $+2$

Answer: D



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46. Which one of the following is most unstable

A. BrF

B. ClF

C. $BrCl$

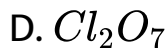
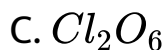
D. IF

Answer: D



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47. The anhydride of perchloric acid is



Answer: D



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48. The type of bonding in HCl molecule is

- A. Pure covalent
- B. Polar covalent
- C. Highly polar
- D. H-bonding

Answer: B



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

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

A. $I > II > III$

B. $II > I > III$

C. $III > II > I$

D. $I > III > II$

Answer: A



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50. F_2 combines with all non-metals directly except

A. N_2

B. P

C. Xe

D. Kr

Answer: A



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51. Antichlor is a compound which

A. absorbs chlorine

B. removes Cl_2 from a material

C. liberates Cl_2 from bleaching powder

D. acts as a catalyst in the manufacture of Cl_2

Answer: B



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52. Which has the highest heat of vaporisation

A. HF

B. HCl

C. HBr

D. HI

Answer: A



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53. Which possesses highest percentage of ionic character

A. HCl

B. HBr

C. HF

D. HI

Answer: C



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54. "Chlorine-type" laundry bleaches are in reality aqueous solution of

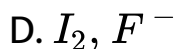
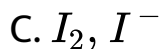
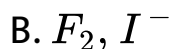
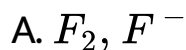


Answer: A



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55. Most powerful oxidant among halogens and most powerful reductant among halide ions are



Answer: C



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56. The most reactive among the following is

A. ICl

B. Cl_2

C. Br_2

D. I_2

Answer: A



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57. The triiodide ion I_3^- formed by dissolving iodine in aqueous potassium iodide has which one of the following structures/ geometries ?

A. Triangular

B. Tetrahedral with one corner occupied by a lone pair of electrons

C. Trigonal bipyramidal with three lone pairs, one occupying the equatorial and two axial positions

D. Linear with bond angle of exactly 180°

Answer: D



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58. Which of the following molecule form hydrogen bond even in the vapour state also .

A. NO_2

B. H_2O

C. HF

D. $C_2H_5NH_2$

Answer: C



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