CHEMISTRY

JEE (MAIN AND ADVANCED) CHEMISTRY

VII GROUP ELEMENTS

Problems

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. Among the reactions,

$F_{2(g)} + 2e^- \rightarrow 2F^-_{(g)}$ and

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

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5. Iodine is violet coloured. Why?

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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. Why?

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8. Bond enthalpy of bromine is $194kJmol^{-}$. If enthalpy of vapourisation of Br_2 is $+30kJmol^{-}$, electron gain enthalpy of Br is $-325kJmol^{-1}$ and hydration enthalpy of bromide is $-339kJmol^{-1}$ calculate the change in enthalpy for the reaction, $\frac{1}{2}Br_2(l)+e^{-}\xrightarrow{aq}Br^{-}(aq)$.

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

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

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

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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 cokpounds 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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Subjective Exercise 1 Very Short Answer Questions

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

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

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

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4. 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 anamolous 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 anamolous behaviour of fluorine.

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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 HCI. 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. How many types of adsorption are known ? What are they ?

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2. Discuss and compare the acidic nature of chlorine.

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

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

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5. Comment on the bleaching and oxidation ability of perchlorate .

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Subjective Exercise 4 Very Short Answer Questions

1. Which halogen has no oxyacids

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2. What is the structure of $HClO_4$?

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

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

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5. Name the less stable oxyanion of chlorine Write the reason .

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6. Give the structures of chlorous acid and chloric acids .

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

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Objective Exercise 1

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

A. 1

B. 3

C. 5

D. 2

Answer: B

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2. Which of the following halogens has metallic character ?

A. F_2

B. CI_2

C. Br_2

D. I_2

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 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. Vandar waal 's force

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

A. M^+

B. M^{2+}

C. M^{-}

D. M^{2-}

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

A. F_2

B. Cl_2

C. Br_2

D. I_2

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_5 type sof molecule if 'A' undergoes sp^3d^2 hybridisation, then the shape of the molecule is

A. T- shape

B. Octahedral

C. Square pyramidal

D. Tetrahedal

Answer: C

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20. The hybridization in interhalogen compound AX_7 is

A. sp^3d^3

B. sp^3

C. sp^3d

D. sp^3d^2

Answer: A

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21. The strongest oxidising agent among the following is

A. Cl_2

B. F_2

C. O_3

D. H_2O_2

Answer: B

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22. The order of reactivity of halogens with Hydrogen is

A. $F_2 < Cl_2 < Br_2 < I_2$

B. $F_2 > Cl_2 > Br_2 > I_2$

C. $F_2 < Br_2 < Cl_2 < I_2$

D. $F_2 > I_2 > Br_2 > Cl_2$

Answer: B

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

A. $E.N: F > Cl > Br$

B. $E.A: Cl > Br < F$

C. Oxidising power : $F_2 > Cl_2 > Br_2$

D. Bond energy : $F_2 > Cl_2 > Br_2$.

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 $KJmole^{-1}$) 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

A. $HF > HCl > HBr > HI$

B. $HF < HCl < HBr < HI$

C. $HCl < HBr < HI < HF$

D. $HF < HBr < HI < HCl$

Answer: C

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28. Match the correct bond dissociation in halogens

Halogens	Bond energy
F_2	$158.8\ \text{Kj mol}^{-1}$
Cl_2	242.6KJmol^{-1}
Br_2	151.1KJmol^{-1}
I_2	192.8KJmol^{-1}

A. $1-A, 2-B, 3-D, 4-C$

B. $1-A, 2-B, 3-C, 4-D$

C. $1-B, 2-A, 3-D, 4-C$

D. $1-D, 2-C, 3-A, 4-B$

Answer: A

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29. Identify the wrong statement/s

I) All halogens are coloured II) F_2 and Cl_2 are gases whereas Br_2 and I_2 are liquids

III) Br_2 and I_2 are sparingly soluble in water but are soluble in various organic solvents like CCl_4, CS_2 etc .

A. Only I & III

B. Only I & II

C. Only II

D. Only II & III

Answer: C

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30. The wrongly matched amongst the following is :

A. Boiling point $/K - HCl < HBr < HI < HF$

B. Acidic strength $- HF < Hcl < HBr < HI$

C. Stability $- HF < HCl < H - Br < HI$

D. Bond dissociation energy $- HCl < HBr < HI < HF$

Answer: D

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31. If 'M' is a monovalent metal , the order of ionic character of their halides respectively is

A. $MF > MCl > MBr > MI$

B. $MI > MBr > MCl > MF$

C. $MF > MCl > MI > MBr$

D. $MCl > MF > MBr > MI$

Answer: A

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

A. Cl_2

B. Br_2

C. I_2

D. N_2

Answer: A

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33. Which of the following has greatest reducing power ?

A. HI

B. HBr

C. HCI

D. HF.

Answer: A

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

A. $HI > HBr > HCl > HF$

B. $HF > HCl > HBr > HI$

C. $HCl < HF > HBr < HI$

D. $HI > HCl < HF < HBr$

Answer: B

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36. Which of the following statements regarding structure is not correct

A. ONF is isoelectronic with O_2N^-

B. OF_2 is an oxide of fluorine

C. Cl_2O_7 is an anhydride of perchloric acid

D. O_3 molecule is bent

Answer: B

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37. 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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38. The following is not a mineral of Chlorine

A. Carnalite

B. Horn silver

C. Sylvine

D. Cryolite

Answer: D

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39. 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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40. CI_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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41. 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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42. At ordinary temperature Cl_2 reacts with

A. O_2

B. N_2

C. He

D. Cu

Answer: D

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43. Chlorine oxidises H_2S to

A. S

B. SO_2

C. H_2SO_4

D. H_2SO_3

Answer: A

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

A. $NCl_3 + HCl$

B. $N_2 + HCl$

C. $NCl_3 + N_2$

D. $N_2 + NH_4Cl$

Answer: D

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

A. N_2 and NCl_3

B. $N_2 + HCl$

C. $NCl_3 + N_2$

D. $N_2 + NH_4Cl$

Answer: D

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

A. $HClO_2$

B. $HClO_3$

C. $HClO_4$

D. $HOCl$

Answer: D

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

A. F_2

B. Cl_2

C. Br_2

D. I_2

Answer: B

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

A. $NaClO$

B. $NaClO_2$

C. $NaClO_3$

D. $NaClO_4$

Answer: C

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49. The catalyst in Deacon 's process is

A. Cu_2Cl_2

B. Pt

C. $AlCl_3$

D. $CuCl_2$

Answer: D

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50. A metal ,M forms chlorides in its +2 and +4 oxidatio states . Which of the following statements about these chlorides is correct ?

A. MCl_2 is more volatile than MCl_4

B. MCl_2 is more soluble in anhydrous ethanol than MCl_4

C. MCl_2 is more ionic than MCl_4

D. MCl_2 is more easily hydrolysed than MCl_2

Answer: C

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51. In the reaction

$$4NaCl + MnO_2 + 4H_2SO_4 \rightarrow MnCl_2 + 4NaHSO_4 + 2H_2O + 'X'$$

Then the correct statement regarding 'X' are

I) It is a greenish yellow coloured gas .

II) It can also be prepared by Deacons process

III) It can be liquefied into greenish yellow liquid which boils at 239K

A. Only I & III

B. Only I & II

C. Only II & III

D. All

Answer: D

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52. In the followingreactions

(a) $6NH_3 + 3Cl_2 \rightarrow 6NH_4Cl + 'x'$

$NH_3 + 3Cl_2 \rightarrow 'y' + 3HCl$

x and y respectively are :

A. HCl and N_2

B. N_2 and HCl

C. N_3H and HCl

D. N_2 and NCl_3

Answer: D

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53. Although electron gain enthalpy of fluorine is less negative as compared to chlorine , fluorine is a stronger oxidizing agent than chlorine this is due to

A. Low enthalpy of dissociation of F- F bond

B. High hydration enthalpy of F^-

C. Bond 1 & 2

D. Least ionization potential

Answer: C

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54. The molecule $ClCH_2CH_2SCH_2CH_2Cl$ is commonly called as

A. Tear gas

B. DDT

C. Mustard gas

D. Phosgene

Answer: C

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55. The wrong statement amongst the following regarding HCl is

A. It is used in the manufacture of glucose from corn starch

B. It is used for extractin glue from bones

C. It is used in the preparation of phosgene

D. It is used in purifying bone black

Answer: C

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56. Choose the Wrong statement amongest the following

A. Chlorine water on long standing loses its yellow colour due to the formation of HCl and HOCl

B. The composition os bleaching power is $Ca(OCl)_2.CaCl_2.Ca(OH)_2 2H_2O$

C. The bleaching action of chlorine water is due to reduction

D. Chlorine gives addition products with unsaturated hydrocarbons

Answer: C

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57. Cl_2 reacts with water and forms

A. $HCl + HOCl$

B. $HCl + O_2 + O_3$

C. $HCl + HOCl + O_3$

D. $HOCl_4O_2$

Answer: A

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58. Predict the correct product when Cl_2 passed through $H - \overset{18}{O} - \overset{18}{O} - H$ solution

A. $H^+ + Cl^- + O_2$ (both oxygen having 18)

B. $HOCl$ and $HClO_2$ (all oxygen having 18)

C. $HClO_4$ and HCl (all oxygen having 18)

D. Cl_2O and H_2O (all oxygen having 18)

Answer: A

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59. Extraction of chlorine from brine solution is based on

A. Oxidation

B. Acidification

C. Chlorination

D. Reduction

Answer: A

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

A. Planar triangle

B. Pyramidal

C. Tetrahedral

D. Square planar.

Answer: B

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61. Sigma bond between CI and O in CIO_4^- is formed by ---- overlapping

A. $sp^2 - p$

B. $sp^2 - s$

C. $sp^3 - s$

D. $sp^3 - p$

Answer: D

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

A. Planar trigonal , $109^0 28^1$

B. Tetrahedral , $109^0 28^1$

C. Pyramidal , 105^0

D. V- shape , 118^0

Answer: B

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63. The number of π bonds in ClO_4^- ion is

A. 2

B. 3

C. 4

D. 1

Answer: B

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64. The number of lone pairs on Chlorine atom in CIO^-, CIO_2^-, CIO_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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65. The order of $Cl - O$ bond energy in $ClO^-, ClO_2^-, ClO_3^-, CIO_4^-$ is

A. $ClO^- > ClO_2^- > ClO_3^- > ClO_4^-$

B. $ClO_4^- > ClO_3^- > ClO_2^- > ClO^-$

C. $ClO_4^- > ClO_2^- > ClO_3^- > ClO^-$

D. $ClO_3^- > ClO^- > ClO_2^- > ClO_4^-$

Answer: B

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66. BrF_5 undergoes hydrolysis then the products formed are

A. $HBrO_2, HF$

B. $HOBr, HF$

C. $HBrO_3, HF$

D. $HBrO_4, HF$

Answer: C

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67. When pt dissolved in aquaregia the complex formed is

A. $PtCl_4$

B. $PtCl_6^{2-}$

C. $PtCl_6^-$

D. $PtCl_4^-$

Answer: B

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68. What products are expected from the disproportionation reaction of hypochlorous acid ?

A. $HClO_3$ and Cl_2O

B. $HClO_2$ and $HClO_4$

C. HCl and Cl_2O

D. HCl and $HClO_3$

Answer: D

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69. Cl in ClO^- undergoes ..... hybridisation

A. sp^2

B. sp^3

C. sp^3d

D. sp^3d^2

Answer: B

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

A. $+7$

B. $+5$

C. $+3$

D. $+1$

Answer: D

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71. 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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72. Thermally most stable oxide is

A. $HOClO_3$

B. $HOClO_2$

C. HOCl

D. HOClO

Answer: A

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73. $4ClO_{3(aq)}^{-} \rightarrow 3ClO_{4(aq)}^{-} + Cl_{(aq)}^{-}$ is an example of

A. Oxidation reaction

B. Reduction reaction

C. Decomposition reaction

D. Disproportionation reaction

Answer: D

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

A. IF_7

B. ClF_3

C. ICl

D. $BrCl_7$

Answer: D

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75. 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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76. The halogen forming largest number of inter-halogens is

A. F

B. Cl

C. Br

D. I

Answer: A

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77. T' shaped interhalogen is

A. ICl

B. ClF_3

C. BrF_5

D. IF_7

Answer: B

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78. Charge distribution in iodine monochloride is best represented as

A. I^+Cl^-

B. $I^{\delta-}Cl^{\delta-}$

C. $I^{-}Cl^{+}$

D. $I^{\delta-}Cl^{\delta+}$

Answer: B

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79. The interhalogen which does not exist is :

A. IF_5

B. ClF_3

C. $BrCl$

D. ICl_4

Answer: D

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Objective Exercise 2

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, ini its third excited state, react 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. The highest oxidation state of fluorine is

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 oxidation and reduction

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 nor be electrolysed

Answer: A

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6.

List I	List II
Property	Order
(A) M.Pts	(1) $I_2 < Br_2 < F_2 < Cl_2$
(B) B.Pts	(2) $Cl > F > Br > I$
(C) Electron affinity	(3) $Cl_2 > Br_2 > F_2 > I_2$
(D) Bond dissociation energy	(4) $F_2 > Cl_2 > I_2 > Br_2$

The correct match is

A.

A	B	C	D
5	5	2	3

B.

A	B	C	D
2	5	3	4

C.
A	B	C	D
1	2	3	4

D.
A	B	C	D
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 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 ?

A. sp^3

B. sp

C. sp^2

D. sp^3d

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 ?

A. PCl_5

B. ClF_4

C. $SbCl_5$

D. $HClO_4$

Answer: D

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

A. $HI > HBr > HCl > HF$

B. $HF > HCl > HBr > HI$

C. $HCl > HF > HBr > HI$

D. $HI > HCl > HF > HBR$

Answer: B

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11. The order of melting point , boiling point and densities of halogens

A. Gradually decreases from F_2 to I_2

B. Gradually increases from $F_2 \rightarrow I_2$

C. Decreases from F_2toBr_2 and then increases

D. Increases from F_2 to Br_2 and then decreases

Answer: B

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12. Which of the following species has four lone pairs of electrons in its valance shell ?

A. I

B. O^-

C. Cl^-

D. He

Answer: C

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13. Which of the following is not correct regarding bond energies

A. The extent of overlap of the atomic orbitals decreases as the size of the atoms increase

B. Among the halogens the bond energy of F_2 is abnormally high (159 KJ mole^{-1})

C. The F_2 molecule it self has a notorisously weak bond $159KJ\text{mole}^{-1}$) compared with chlorine $243KJ\text{mole}^{-1}$

D. According Mulliken $p\pi - d\pi$ bonding is not possible in fluorine

Answer: B

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14. Fluorine is a stronger oxidising agent than chlorine in aqueous solution . This is attributed to many factors except

A. Heat of dissociation

B. Electron affinity

C. Ionization potential

D. Heat of hydration

Answer: C

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15. Easiest to perform in the following is

A. $F_{2(g)} + 2e^- \rightarrow 2F^-_{(g)}$

B. $Cl_{2(g)} + 2e^- \rightarrow 2Cl^-_{(g)}$

C. $Br_{2(g)} + 2e^- \rightarrow 2Br^-_{(g)}$

D. $I_{2(g)} + 2e^- \rightarrow 2I^-_{(g)}$

Answer: A

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

A. NH_3

B. H_2O

C. HI

D. C_2H_5OH

Answer: C

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

A. $HCl > HBr > HF$

B. $HF > HBr > HCl$

C. $HF > HCl > HBr$

D. $HBr > HCl > HF$

Answer: C

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

A. $F_2 + 2Cl^- \rightarrow 2F^{-1} + Cl_2$

B. $Br_2 + 2I^- \rightarrow 2Br^- + I_2$

C. $Cl_2 + 2F^- \rightarrow 2Cl^- + F_2$

D. $Cl_2 + 2Br^- \rightarrow 2Cl^- + Br_2$

Answer: C

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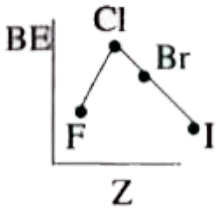
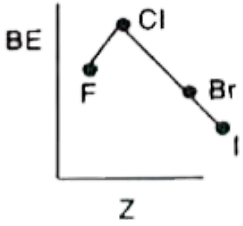
19. Which of the following shows variation of BE of halogens

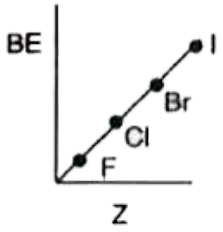
A.



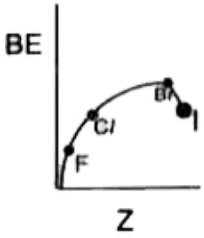
B.



C.



D.



Answer: A

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20. In the reaction

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

A. Bromine is oxidised and carbonate is reduced

B. Bromine is both oxidised and reduced

C. Bromine is reduced and water is oxidised

D. Bromine is neither oxidised nor reduced

Answer: B

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21. Which one of the following ion has the highest value of ionic radius?

A. Li^+

B. B^{3+}

C. O^{2-}

D. F^{-}

Answer: C

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22. Poor conductor of electricity is

A. $aq.\ H_2F_2$

B. $aq.\ HCl$

C. $aq.\ HBr$

D. $aq.\ Hi$

Answer: A

Watch Video Solution

23. No gas is liberated when the following HX is treated with MnO_2 and $con.\ H_2SO_4$

A. HCl

B. HF

C. HBr

D. HI

Answer: B

Watch Video Solution

24. Which of the following does not form precipitate with $AgNO_3$?

A. HF

B. HCl

C. HBr

D. HI

Answer: A

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25. Which redical can bring about the highest oxidation state of a transition metal ?

A. Br^-

B. Cl^-

C. F^-

D. I^-

Answer: C

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26. I) Fluorine reacts with cold , dilute alkalies liberating O_2 gas.

II) Chlorine reacts with hot ,conc . Alkalies to form chlorides and chlorates .

III) Bromine reacts with cold ,dil .alkali to form bromide and hypobromite

The correct combination is

A. Only I & II are correct

B. Only II and III are correct

C. Only I and III are correct

D. Only III is correct

Answer: B

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

A. They are all capable of exhibiting more than one oxidation states

B. They are all diatomic and form diatomic ions

C. They are all diatomic and form univalent ions

D. They are all reducing agents .

Answer: C

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28. $KMnO_4$ acts as an oxidising agent in alkaline medium, when alkaline $KMnO_4$ is treated with KI, iodine ion is oxidised to

A. I_2

B. IO^-

C. IO_3^-

D. IO_4^-

Answer: C

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29. Gaseous HCl is a poor conductor of electricity while its aqueous solution is a good conductor this is because

A. H_2O is a good conductor of electricity

B. Agas cannot conduct electricity but a liquid can

C. HCl gas does not obay Ohm's law ,where as the solution does

D. HCl ionises in aqueous solution

Answer: D

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

A. Oxygen in air reacts with the emitted HCl gas to form a cloud of chlorine gas

B. Strong affinity of Hcl gas for moisture in air results in forming of droplets of liquid solution which appears like a cloudy smoke .

C. Due to strong affinity for water , concentrated hydrochloric acid pulls moisture of air towards itself . This moisture forms droplets of water .

D. Concentrated hydrochloric acid emits strongly smelling HCl gas all the time

Answer: C

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31. Which statement is incorrect

A. Chlorine can bleach a wet piece of cloth

B. Chlorine in water gives HOCl

C. Bromine can be prepared from carnalite

D. Bromine is not liberated when iodine is passed through an acidified KBr solution

Answer: D

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32. Which of the following is used in the preparation of chlorine ?

A. Only MnO_2

B. Only $KMnO_4$

C. Both MnO_2 and $KMnO_4$

D. Either MnO_2 or $KMnO_4$

Answer: D

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33. Consider the following reaction

$6NaOH_{(\text{Hot. Conc.})} + 3Cl_2 \rightarrow 5NaCl + A + 3H_2O$. What is the oxidation number of chlorine in "A"?

A. $+5$

B. -1

C. $+3$

D. $+4$

Answer: C

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34. A halogen (x) reacts with sulphur gives a compound (y) .(y) reacts with ethylene to give Mustard gas . Then

A. $x = Cl_2, y = S_2Cl_2$

B. $x = Cl_2, y = SCl_4$

C. $x = Cl_2, y = S_2Cl$

D. $x = Br_2, y = SCl_2$

Answer: A

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35. If Cl_2 gas is passed into aqueous solution of KI containing some CCl_4 and the mixtures is shaken

A. upper layer become violet

B. homogeneous violet layer is formed

C. organge colour appears

D. lower layer beomes violet

Answer: D

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36. $NH_3(\text{excess}) + 3C < oA + N_2 \uparrow$, the bonds present in compound A is

A. Ionic , covalent and dative

B. Ionic and covalent

C. Dative and ionic

D. Dative only

Answer: A

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37. Chlorine reacts with nitric oxide to form

A. $NOCl_2$

B. $NOCl$

C. NO_2Cl_2

D. NO_2Cl

Answer: B

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

A. Cl_2

B. Br_2

C. I_2

D. N_2

Answer: A

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40. The Incorrect statement regarding Nelson cell process

A. H_2 and $NaOH$ are the by products in this process

B. At anode $2Cl^- \rightarrow 2e^- + Cl_2$ liberated

C. $2H_2O + 2e^- \rightarrow H_2 + 2OH^-$ at cathode

D. Hydrogen chloride is oxidised to give chlorine

Answer: D

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41. Hydrochloric acid at $25^{\circ} C$ is

A. Ionic and liquid

B. Covalent and liquid

C. Ionic and gas

D. None of above

Answer: A

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42. Chlorine is passed into dilute, cold KOH solution. What are the oxidation numbers of chlorine in the products formed ?

A. $-1 \text{ and } +5$

B. -1 and $+3$

C. $+1$ and $+7$

D. $+1$ and -1

Answer: D

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43. Which of the following reactions represent Deacon's process ?

A. $4HCl + O_2 \xrightarrow{CuCl_2} 2Cl_2 + 2H_2O$

B. $2H_2O + 2Cl_2 \xrightarrow{\text{Sunlight}} 4HCl + O_2$

C. $4NH_3 + 5O_2 \xrightarrow{\text{Rh gauge}} 4NO + 6H_2O$

D. $2SO_2 + O_2 \xrightarrow{V_2O_5} 2SO_3$

Answer: A

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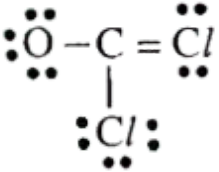
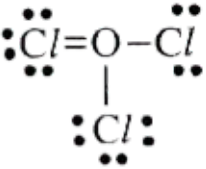
44. Select the most stable structure of $COCl_2$

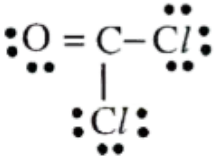
A.



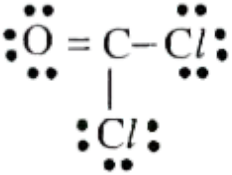
B.



C.



D.



Answer: C

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45. 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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46. 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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47. T' shaped interhalogen is

A. IC l

B. ClF_3

C. BrF_5

D. IF_7

Answer: B

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48. Most unstable among the following is

A. ClO_4^-

B. ClO_3^-

C. ClO_2^-

D. OCl^-

Answer: D

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49. The aqeous solution of which of the following salt will have the lowest pH ?

A. $NaClO$

B. $NaClO_2$

C. $NaClO_3$

D. $NaClO_4$

Answer: D

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50. $Br_2 + NaOH \rightarrow NaBrO_3 + H_2O$ In the above balanced chemical equation, number of moles of Br_2 reduced to bromide is

A. 1.5

B. 2.5

C. 3

D. 5

Answer: B

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51. The correct order of acedic strength of the following compounds is

A. $HClO > HClO_2 > HClO_3 > HClO_4$

B. $HClO_4 > HClO_3 > HClO_2 > HClO$

C. $HClO_2 > HClO > HClO_3 > HClO_4$

D. $HClO_4 > HClO_2 > HClO_3 > HClO$

Answer: B

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52. Correct trends from ClO^- to ClO_4^- are

A) Oxidation ability decreases

B) Number of delocalised electrons increases

C) Number of lone electron pairs on chlorine decreases

D) O- Cl bond length decreases

A. A,B,C only

B. B,C,D only

C. A,C,D only

D. A,B,C and D

Answer: D

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53. $Cl_{2(g)} + Ba(OH)_2 \rightarrow X_{(aq)} + BaCl_2 + H_2O$

$X + H_2SO_4 \rightarrow Y + BaSO_4,$

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

Substances 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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54. $4ClO^-_{3(aq)} \rightarrow 3ClO^-_{4(aq)} + Cl^-_{(aq)}$ is an example of

A. Oxidation reaction

B. Reduction reaction

C. Disproportionation reaction

D. Decomposition reaction

Answer: C

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55. 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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56. Among the following ion the one that cannot undergo disproportionation

A. ClO_4^-

B. ClO_3^-

C. ClO_2^-

D. ClO^-

Answer: A

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

A. They are more reactive than halogens

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

C. They are covalent in nature

D. They have low boiling points and are highly volatile.

Answer: D

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58. Which of the following is not correct regarding the interhalogen compound bromine pentafluoride

A. It is formed in fifth excited state of bromine

B. Oxidation number of bromine is $+5$

C. Hybridisation of bromine is sp^3d^2

D. It has square monopyramidal structure

Answer: A

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59. Interhalogen compounds are more reactive than the constituent halogens except fluorine - Explain.

A. Two halogens present in place of one

B. They are more ionic

C. Their bond polarity is more than that of the halogen molecule

D. They carry more energy

Answer: C

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60. Only iodine forms hepta -fluoride IF_7, but chlorine and bromine give penta -fluorides.The reason for this is

A. low electron affinity of iodine

B. unsual pentagenal bipyramidal structure of IF_7

C. that the larger iodine atom can accommodate more number of smaller fluorine atom around it

D. low chemical reactivity of IF_7

Answer: C

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Objective Exercise 3

1. Which one of the following orders is not in accordance with the property stated against it?

A. $F_2 > Cl_2Br_2 > I_2$: Bond dissociation energy

B. $F_2 > Cl_2 > Br_2 > I_2$: Oxidising power

C. $HI > HBr > HCl > HF$: Acidic property in water

D. $F > Cl > Br > I$: Electronegativity

Answer: A

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2. The correct order of acedic strength of the following compounds is

A. $HClO_4 < HClO_3 < HClO_2 < HClO$

B. $HClO < HClO_2 < HClO_3 < HClO_4$

C. $HClO_4 < HClO < HClO_2 < HClO_3$

D. $HClO_2 < HClO_3 < HClO_4 < HClO$

Answer: B

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3. The correct order of bond angles in the following species is

A. $Cl_2O < ClO_2 < ClO_2^-$

B. $ClO_2 < Cl_2O < ClO_2^-$

C. $Cl_2O = ClO_2^- < ClO_2$

D. $ClO_2^- < Cl_2O < ClO_2$

Answer: C

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4. Which of the following is the strongest oxidising agent?

A. Br_2

B. I_2

C. Cl_2

D. F_2

Answer: D

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5. In which of the following arrangements the given sequence is not strictly according to the property indicated against it ?

A. $HF < HCl < HBr < HI$: increasing acidic strength

B. $H_2O < H_2S < H_2Se < H_2Te$: increasing pK_a values

C. $NH_3 < PH_3 < AsH_3 < SbH_3$: increasing reducing character

D. $CO_2 < SiO_2 < SnO_2 < PbO_2$: increasing oxidising power

Answer: B

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6. Which of the following is the strongest acid ?

A. $HClO_4$

B. H_2SO_3

C. H_2SO_4

D. $HClO_3$

Answer: C

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7. Which of the statements given below is incorrect ?

A. SO_2 molecule is bent

B. ONF is isoelectronic with O_2N^-

C. OF_2 is an oxide of fluorine

D. Cl_2O_7 is an anhydride of perchloric acid

Answer: A

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8. Correct order of boiling points of hydrogen halides is

A. There is strong hydrogen bonding between HF molecules

B. The bond energy of HF molecules is greater than in other hydrogen halides

C. The effect of nuclear shielding is much reduced in fluorine which polarises the HF molecule

D. The electronegativity of fluorine is much higher than for other elements in the group

Answer: A

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9. Give the bond dissociation order of halogens.

A. $Br_2 > I_2 > F_2 > Cl_2$

B. $F_2 > Cl_2 > Br_2 > I_2$

C. $I_2 > Br_2 > Cl_2 > F_2$

D. $Cl_2 > Br_2 > F_2 I_2$

Answer: D

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10. $HgCl_2$ and I_2 both when dissolved in water containing I^- ions the pair of species formed

A. Hg_2I_2, I^-

B. Hg_2I_2, I_3^-

C. HgI_2, I^-

D. HgI_4^{2-}, I_3^-

Answer: D

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11. Match the interhalogen compounds of column I with the geometry in column II and assign the correct

Column I	Column II
XX'	T-shap
XX_3'	Pentagonal bipyramidal
XX_5	Linear
XX_7	Square -pyramidal
	Tetrahedral

A. $\begin{matrix} a & b & c & d \\ iv & iii & ii & i \end{matrix}$

B. $\begin{matrix} a & b & c & d \\ iii & iv & i & ii \end{matrix}$

C. $\begin{matrix} a & b & c & d \\ iii & i & iv & ii \end{matrix}$

D.
a	b	c	d
iv	iv	iii	ii

Answer: C

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12. Which of the following statements is not true for halogens ?

A. All but fluorine show positive oxidation states

B. MI are oxidizing agents

C. All form monobasic oxyacids

D. Chlorine has the highest electron -gain enthalpy

Answer: A

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Objective Exercise 4

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) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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2. (A): Reaction given below is possible

$2KCI + Br_2 \rightarrow Cl_2 + 2KBr$

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

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

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) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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

(R): $CI-O$ bond order increases from CIO^- to CIO_4^-.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

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) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

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) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

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) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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

(R) : Bromine is more electronegative than iodine.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

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) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: C

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

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

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

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) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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

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

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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13. (A): Oxidation ability increases from $HOCI$ to $HCIO_4$

(R): Oxidation number of chlorine increases from $HOCI$ to $HCIO_4$

.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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14. (A) Aqueous fluoride on electrolysis at inertanode liberates oxygen

(R) Fluorine reacts vigorously with water to liberate oxygen

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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15. (A): Fluorine does not form oxyacids

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

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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

(R): Iodine absorbsviolet part of electro magnetic radiation .

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: C

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

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

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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18. (A) HClO is stronger acid than HBrO

(R) Greater is the electronegativity of the halogen , greater will be attraction of electron pair towards it and hence more easily the H^+ ion will be released.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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19. (A) : Fluorine is the best oxidising agent

(R) SRP is highest for Fluorine

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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20. OF^- does not exist , though HOF is known

(R) HOF molecule does not ionise easily

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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21. (A) Halogens are coloured

(R) Colour is a characristic property of elements of d- block

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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22. (A) Bond energy of Cl_2 is less than that of F_2

(R) Bond energy of Br_2 is less than that of F_2

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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23. (A) Hydration energy of iodide is highest among halides

(R) Greater the size of halide , higher is the hydration energy

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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24. (A) Highest atomicity of an interhalogen compound is 8

(R) Highest valency exhibited by a halogen , other than fluorine is 7

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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25. (A) Fluoride is oxidised by managanese dioxide

(R) Manganese dioxide is reduced to mana

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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26. (A) Iodine is dissolved well in aqueous KI solution

(R) Iodine forms a complex tri -iodide ion in aqueous KI solution

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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27. (A) Compared to Br_2, Icl is more reactive

(R) Br_2 is non -polar ,but Icl is polar

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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28. (A) Chlorine dioxide is paramagnetic

(R) Chlorine dioxide molecule has odd number of electrons

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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29. (A) F-F bond is stronger than Cl -Cl bond

(R) Atomic size of F is larger than that of Cl.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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30. (A) Perhalate ions are tetrahedral in shape

(R) Halogens underdo sp^3 hybridization in perhalates

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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31. (A) Iodine is least basic whereas fluorine is most basic , among halogens

(R) The reactivity of halogens increases from fluorine to iodine

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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32. F_2 shows disproportionation reactions

(R) F_2 is the weakest oxidising agent and it is always reduced.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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33. (A) The bleaching of flowers by chlorine is permanent while that by SO_2 is temporary

(R) Chlorine bleaches by reduction and SO_2 by oxidation

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: C

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34. (A) Halogens have maximum negative electron gain enthalpy in the respective periods of the periodic table

(R) Halogens have the smallest size in their respective periods and high effective nuclear charge

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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35. (A) Electron gain enthalpy of fluorine is less than chlorine but fluorine is a strong oxidising agent than chlorine

(R) Fluorine has low enthalpy of dissociation and fluoride has high hydration enthalpy

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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36. (A) Iodine does not react with water

(R) Reaction of iodine with water is non spontaneous

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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37. (A) Fluorine exhibits only -I oxidation state

(R) Fluorine is called super halogen

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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38. (A) Among HX , HF is liquid while others are gases

(R) HF has strong hydrogen bond

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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39. (A) In HX , stability decreases down the group

(R) Bond dissociation enthalpy oeder of HX is

$H - F > H - Cl > H - Br > H - I$

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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40. (A) Iodine oxides are more stable than chlorine and bromine oxides

(R) Iodine is the solid halogen ,but chlorine and bromine are gaseous and liquid halogens

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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41. (A) I_2O_5 is used for the estimation of carbon monoxide in qualitative analysis

(R) I_2O_5 is insoluble and decomposes on heating

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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42. (A) $SnCl_4$ is more covalent than $SnCl_2$

(R) Compound with higher oxidation state of metal is more covalent than with lower oxidation state

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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43. (A) Sea is the greatest source of some halogens

(R) Halogens are highly reactive

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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44. (A) Aqueous solution of chlorine is a bleaching agent

(R) In presence of moisture ,chlorine liberates nascent oxygen which remove the colour of organic matter

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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45. (A) Reaction of Cl_2 with hot and concen -trated $NaOH$ is disproportionation reaction

(R) Oxidation state of chlorine changed from $0 \text{to} -1 \text{ and } +5$

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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46. (A) The noble metals like gold ,platinum dissolved in aqua regia (R) $3:1$ ratio of Conc HCl and Conc HNO_3 is called aqua regia

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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47. (A) With HCl ,Fe forms $FeCl_2$ and H_2

(R) Formed H_2 prevents the formation of $FeCl_3$

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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48. (A) Fluorine forms only one oxyacid HOF

(R) Fluorine has small size and high electronegativity

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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49. (A) Acidic nature increases from HOCl to $HClO_4$

(R) Oxidation number of chlorine increases from HClO to $HClO_4$

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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50. (A) Hydrolysis of BrF_3 gives HF and $HBrO_2$

(R) In the hydrolysis of interhalogen compounds ,lower halogen forms halide & higher halogen form oxyhalide

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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51. (A) IF_7 is the highest numbered inter halogen compound

(R) Radius ratio between I and F in IF_7 is minimum

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: C

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52. (A) HCl most volatile hydrogen halide

(R) HCl has lowest boiling point

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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53. (A) Aqueous chlorine turns blue litmus to red

(R) Aquous chlorine is acidic

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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54. (A) Pka value of HF is positive

(R) HF is strongest acid among HX

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: C

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55. (A) IC l more reactive than F_2

(R) $I - Cl$ bond is weaker than F-F bond

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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