

# SRIGAYATRI EDUCATIONAL INSTITUTIONS

## INDIA

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### 17<sup>th</sup> Group

- When  $F_2$  reacts with hot and conc. Alkali, then following will be obtained :
  - $OF_2$
  - $O_2$
  - $H_2O$
  - $NaF$
- Which pair gives  $Cl_2$  at room temperature ?
  - Conc.HCl+KMnO<sub>4</sub>
  - $NaCl + Conc.H_2SO_4$
  - $NaCl + MnO_2$
  - $NaCl + Conc.HNO_3$
- Which reaction is possible ?
  - $I_2 + 2NaBr \rightarrow Br_2 + 2NaI$
  - $I_2 + 2NaCl \rightarrow Cl_2 + 2NaI$
  - $Br_2 + 2NaCl \rightarrow Cl_2 + 2NaBr$
  - $Cl_2 + 2NaBr \rightarrow Br_2 + 2NaCl$
- Tincture of iodine is :
  - $I_2$ , KI and rectified spirit and water
  - $I_2$  and rectified spirit
  - KI and rectified spirit
  - $I_2$  and water
- Among the following reactions, in which of the following a blue complex will be formed when starch solution is added ?
  - When chlorine is passed through NaI
  - Sodium iodate is treated with sodium bisulphite solution
  - KI is treated with  $MnO_2$  and conc.  $H_2SO_4$
  - $CuSO_4$  solution is added in KI solution
  - KI is added to bleaching powder containing dilute acetic acid
  - 1,3
  - 1,3,4,5
  - 2,3,4
  - all of these
- In which case, the order of acidic strength is not correct ?
  - $HI > HBr > HCl$
  - $HIO_4 > HBrO_4 > HClO_4$
  - $HClO_4 > HClO_3 > HClO_2$
  - $HF > H_2O > NH_3$

7. Thermally most stable compound is :
- a)  $\text{HOClO}_3$       b)  $\text{HOClO}_2$       c)  $\text{HOCl}$       d)  $\text{HOClO}$
8. Which of the following halogen disproportionate in water
- a)  $\text{F}_2$       b)  $\text{Cl}_2$       c)  $\text{I}_2$       d) All of these
9. Which of the following is correct statement
- a)  $\text{F}_2$  has higher dissociation energy than  $\text{Cl}_2$       b) F has higher electron affinity than Al
- c) HF is stronger acid than HCl      d) Boiling point increases down the group in halogens
10. Which anion can undergo both oxidation and reduction ?
- a)  $\text{Cr}_2\text{O}_7^{2-}$       b)  $\text{NO}_3^-$       c)  $\text{OCl}^-$       d)  $\text{S}^{2-}$
11. Consider the oxy acids  $\text{HClO}_n$  series, here value of n is 1 to 4, then incorrect statement regarding these oxy acids is :
- a) Acidic character of oxy acids increase with increasing value of n
- b) Oxidising power of oxy acids increases with decreasing value of n
- c) Thermal stability of oxy acids decreases with increasing value of n
- d) 'Cl-o' bond order decreases with decreasing value of n
12. Bromine is commercially prepared from sea water by displacement reaction
- $$\text{Cl}_2 + 2\text{Br}^-_{(aq)} \rightarrow 2\text{Cl}^-_{(aq)} + \text{Br}_2$$
- $\text{Br}_2$  gas thus formed is dissolved into solution of  $\text{Na}_2\text{CO}_3$  and then pure  $\text{Br}_2$  is obtained by treatment of the solution with :
- a)  $\text{Ca}(\text{OH})_2$       b)  $\text{NaOH}$       c)  $\text{H}_2\text{SO}_4$       d) HI
13. Which of the following properties of halogens increase with increasing atomic number ?
- a) Ionization energy      b) Ionic radius
- c) Bond energy of the  $\text{X}_2$  molecule      d) Enthalpy of vaporisation
- a) 1,2,3      b) 1,3      c) 2,4      d) 4
14.  $\text{Cl}_2(\text{g}) + \text{Ba}(\text{OH})_2 \rightarrow x_{(aq)} + \text{BaCl}_2 + \text{H}_2\text{O}$
- $$\text{X} + \text{H}_2\text{SO}_4 \rightarrow \text{y} + \text{BaSO}_4$$
- $$\text{y} \xrightarrow[\Delta > 365\text{k}]{\Delta} \text{z} + \text{H}_2\text{O} + \text{O}_2$$
- y and z are respectively.

- a)  $HClO_4, ClO_2$     b)  $HClO_3, ClO_2$     c)  $HClO_3, ClO_6$     d)  $HClO_4, Cl_2O$

15. The incorrect order is :

- a)  $HF < HCl < HBr < HI$  : Acidic strength  
 b)  $HF < HCl < HBr > HI$  : Thermal stability  
 c)  $HF > HCl > HBr > HI$  : Boiling point  
 d)  $HF > HCl > HBr > HI$  : Bond dissociation enthalpy

### Numerical

16. For oxyacid  $HClO_x$ , If  $x = y = z$  ( $x, y$  and  $z$  are natural numbers), then calculate the value of  $|x + y + z|$ . Where  $x$  = number of 'O' atoms.

$y$  = total number of lone pairs at central atom.

$z$  = total number of Pi ( $\pi$ ) electrons in the oxyacid.

17. How many moles of given compound are decomposed in the following decomposition in the following decomposition reaction?  $NaCl \xrightarrow{\Delta} NaClO_3 + NaCl$

18. What is covalence of chlorine atom in second excited state ?

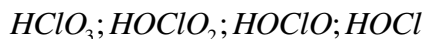
### KEY SHEET

1) c	2) a	3) d	4) a	5) d	6) b	7) a	8) b	9) d	10) c
11) c	12) c	13) c	14) b	15) c	16) 6	17) 3	18) 5		

### HINTS

1. Conceptual
2. Conceptual
3. Conceptual
4. Conceptual
5. a)  $Cl_2 + NaI \rightarrow 2NaCl + I_2$   
 b)  $2NaIO_3 + 5NaHSO_3 \rightarrow 3NaHSO_4 + 2Na_2SO_4 + H_2O + I_2$   
 c)  $2KI + MnO_2 + 3H_2SO_4 \rightarrow 2KHSO_4 + MnSO_4 + 2H_2O + I_2$   
 d)  $2MSO_4 + 4KI \rightarrow 2K_2SO_4 + Cu_2I_2 + I_2$
6.  $HClO_4 > HBrO_4 > HIO_4 \Rightarrow$  acidic strength has been decided on the basis of electron negativity or charge density on central atom.

7. Decreasing order of thermal stability of oxy acids of chlorine.



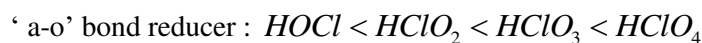
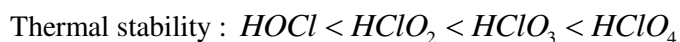
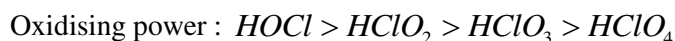
In  $HClO_3$ , chlorine is in +7 oxidation state.

8. Conceptual

9. a) –bond dissociation energy of  $F_2$  is less than that of  $Cl_2$   
 b) –a has higher E.A. than fluorine  
 c) HF is weaker acid than HCl, due to higher bond energy

10. Conceptual

11. Acidic character :  $HOCl < HClO_2 < HClO_3 < HClO_4$



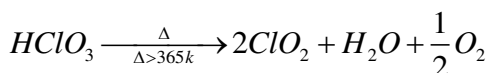
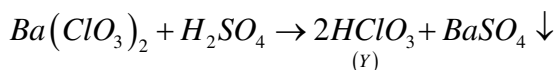
12.  $3Br_2 + 3Na_2CO_3 \rightarrow 5NaBr + NaBrO_3 + 3CO_2 \uparrow \xrightarrow{\Delta, H_2SO_4} 3Br_2 \uparrow + Na_2SO_4$

(impure) ( Hot aq.sol.)

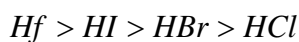
(Pure)

13. Conceptual

14.  $6Cl_2 + 2Ba(OH)_2 \rightarrow Ba(ClO_3)_2 + 5BaCl_2 + 6H_2O$



15. Correct order p.bt



Dipole – dipole attraction (v.w.forces)

In case of same type of Vander wales force of attraction b.pt  $\propto$  molecular mass.

16.  $HClO_2$

$$x = y = z = 2$$

$$x + y + z = 6$$

17. Conceptual

18. Conceptual