

**P-Block Elements--VII-A Group Elements**

2010

1. Which is monoatomic? [MP PMT]  
1. Sulphur                      2. Helium                      3. Phosphorus                      4. Chlorine
2. Which of the following compounds gives chlorine dioxide when it reacts with  $SO_2$  in the presence of acid? [Guj.CET]  
1. Sodium chloride                      2. Sodium chlorate  
3. Sodium perchlorate                      4. Sodium chlorite
3. The correct order of acidity is [Haryana PMT]  
1.  $HClO < HClO_2 < HClO_3 < HClO_4$                       2.  $HClO_4 < HClO_3 < HClO_2 < HClO$   
3.  $HClO < HClO_4 < HClO_3 < HClO_2$                       4.  $HClO_4 < HClO_2 < HClO_3 < HClO$
4. Chlorine shows bleaching action in [OJEE]  
1. Dry condition                      2. Presence of HCl only  
3. Moist condition                      4. None of these
5. Fluorine is not prepared by general methods because [BVP]  
1. HF can be easily oxidised                      2. HF cannot be easily oxidised  
3. HF is highly poisonous                      4. HF is a good conductor of electricity
6. Fluorine reacts with water to give [BVP]  
1. HF and  $O_2$                       2. HF and  $OF_2$                       3. HF and  $O_3$                       4. HF,  $O_2$  and  $O_3$

7. Which one of the following halogens has the highest bond dissociation energy? [VMCC]

1.  $F_2$                       2.  $Cl_2$                       3.  $Br_2$                       4.  $I_2$

8. Assertion:  $F_2$  has high reactivity.

Reason: F – F bond has low bond dissociation enthalpy. [VMCC]

1. Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
2. Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
3. Assertion is true but Reason is false.
4. Both Assertion and Reason are false.

2009

9. Which of the following halogens does not exhibit a positive oxidation number in their compounds? [KCT]

1. I                      2. Br                      3. Cl                      4. F

10. Fluorine reacts with dilute NaOH and forms a gaseous product A. The bond angle in the molecule of A is [EAMCET]

1.  $104^{\circ}40'$                       2.  $103^{\circ}$                       3.  $107^{\circ}$                       4.  $109^{\circ}28'$

11. The most powerful oxidising agent of the following is [J & K CET]

1.  $I_2$                       2.  $F_2$                       3.  $Br_2$                       4.  $Cl_2$

12. The reaction of  $Cl_2$  with X gives bleaching power. X is [OJEE]
1. CaO                                      2.  $Ca(OH)_2$                                       3.  $Ca(OCl)_2$                                       4.  $Ca(ClO_3)_2$

13. Hypochlorite disproportionates to give [OJEE]
1.  $Cl^-$  and  $ClO_4^-$                       2.  $ClO_4^-$  and  $ClO_3^-$                       3.  $ClO_3^-$  and  $Cl^-$                       4.  $ClO_2^-$  and  $Cl^-$

14. The reaction that takes place when  $Cl_2$  gas is passed through conc. NaOH solution is [WB JEE]
1. Oxidation                                      2. Reduction
3. Displacement                                      4. Disproportionation

2008

15. Which of the following dissolves in water but does not give any oxyacid solution? [CPMT]
1.  $SO_2$                                       2.  $OF_2$                                       3.  $SCl_4$                                       4.  $SO_3$

16.  $NaCl, NaBr$  and  $NaI$  mixture on heating with conc  $H_2SO_4$  gives gases, respectively [JCECE]
1.  $HCl, HBr, HI$                       2.  $HCl, Br_2, I_2$                       3.  $Cl_2, Br_2, I_2$                       4.  $Cl_2, HBr, HI$

17. When chlorine reacts with dil. NaOH under cold conditions, the oxidation state of chlorine changes from zero to [J&K CET]
1. - 1 and + 5                                      2. + 1 and + 4
3. + 5 and + 3                                      4. - 1 and + 1

2007

18. Which one below is a pseudo halide? [AFMC]

1.  $CN^-$                       2.  $ICI$                       3.  $IF_5$                       4.  $I_3^-$

19. Which one of the following is the true covalent oxide of iodine? [AIIMS]

1.  $I_2O_4$                       2.  $I_2O_5$                       3.  $I_2O_7$                       4.  $I_2O_9$

20. Which reaction is not feasible? [BHU]

1.  $2KI + Br_2 \rightarrow 2KBr + I_2$                       2.  $2KBr + I_2 \rightarrow 2KI + Br_2$   
3.  $2KBr + Cl_2 \rightarrow 2KCl + Br_2$                       4.  $2H_2O + 2F_2 \rightarrow 4HF + O_2$

21. Chlorine reacts with excess of ammonia to form [Kerala CEE]

1.  $NH_4Cl$     2.  $N_2 + HCl$     3.  $N_2 + NH_4Cl$     4.  $N_2 + NCl_3$     5.  $NCl_3 + HCl$

22. Which of the following is not correct? [EAMCET]

1. In Nelson method of NaOH preparation,  $Cl_2$  is liberated at anode  
2. With hot and concentrated NaOH,  $Cl_2$  gas gives NaOCl.  
3. NaOH reacts with white phosphorus to give phosphine  
4. NaOH is used in rayon industry

23. Bleaching action of  $CaOCl_2$  is due to [RPMT]

1. Nascent Oxygen    2. Chlorine                      3.  $HClO$                       4.  $HCl$

24. Least stable oxide of chlorine is [BCECE]

1.  $Cl_2O$                       2.  $ClO_2$                       3.  $Cl_2O_7$                       4.  $ClO_3$

25. The bleaching action of chlorine is due to the liberation of the following

[J&K CET]

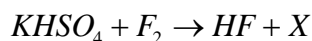
1. HOCl                      2. HCl                      3. [O]                      4. O<sub>2</sub>

2006

26. Tincture of iodine is

1. XeF<sub>2</sub>                      2. XeF<sub>4</sub>                      3. XeO<sub>3</sub>                      4. XeF<sub>6</sub>

27. What is X, in the following reaction?



[EAMCET]

1. K<sub>2</sub>SO<sub>4</sub>                      2. K<sub>2</sub>S<sub>2</sub>O<sub>4</sub>                      3. K<sub>2</sub>S<sub>2</sub>O<sub>2</sub>                      4. K<sub>2</sub>S<sub>2</sub>O<sub>8</sub>

28. Solubility of iodine in water may be increased by adding [Manipal]

1. Chloroform                      2. Potassium Iodide  
3. Carbon Disulphide                      4. Sodium Thiosulphate

29. Which of the following is anhydride of perchloric acid? [RPMT]

1. Cl<sub>2</sub>O<sub>7</sub>                      2. Cl<sub>2</sub>O<sub>5</sub>                      3. Cl<sub>2</sub>O<sub>3</sub>                      4. HClO

30. Fluorine is the best oxidising agent because it has [RPMT]

1. Highest electron affinity                      2. Highest  $E_{red}^{\circ}$   
3. Highest  $E_{oxid}^{\circ}$                       4. Lowest electron affinity

31. Colour of the solution when KI reacts with Br<sub>2</sub> is [JCECE]

1. Blue                      2. Black                      3. Red                      4. No change

2005

32. Which one of the following oxides is expected to exhibit paramagnetic

behaviour?

[CBSE AIPMT]

1.  $CO_2$                       2.  $SO_2$                       3.  $ClO_2$                       4.  $SiO_2$

33. What is the formula of bleaching power?

[Punjab PMET]

1.  $CaO(OCl)$               2.  $Ca(OCl)Cl$               3.  $Ca(OCl)_2$               4.  $Ca(OCl)_2 Cl$

34. The mixture of concentrated HCl and  $HNO_3$  made in 3:1 ratio contains

[Kerala CEE]

1.  $ClO_2$                       2.  $NOCl$                       3.  $NCl_3$                       4.  $N_2O_4$

5.  $N_2O$

35.  $S_2Cl_2$  Hydrolyses slowly to form HCl,  $SO_2$  and X. Which of the following is X?

[EAMCET]

1.  $SO_3$                       2.  $H_2$                       3.  $O_2$                       4. S

36. Which of the following is not correct?

[EAMCET]

1.  $XeO_3$  has four  $\sigma$  and four  $\pi$ -bonds.
2. The hybridization of Xe in  $XeF_4$  is  $sp^3d^2$ .
3. Among noble gases, the occurrence (per cent by weight) of argon is highest in air.
4. Liquid helium is used as cryogenic liquid.

37. Which of the following is the strongest acid? [Haryana PMT]

1.  $\text{ClO}_3(\text{OH})$       2.  $\text{ClO}_2(\text{OH})$       3.  $\text{SO}(\text{OH})_2$       4.  $\text{SO}_2(\text{OH})_2$

2004

38. Assertion:  $\text{HClO}_4$  is a stronger acid than  $\text{HClO}_3$ .

Reason: Oxidation state of Cl in  $\text{HClO}_4$  is +7 and in  $\text{HClO}_3$  is +5.

[AIIMS]

1. Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
2. Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
3. Assertion is true but Reason is false.
4. Both Assertion and Reason are false.

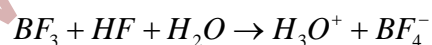
39. Among the halogens, the one which is oxidised by nitric acid is [KCET]

1. Fluorine      2. Iodine      3. Chlorine      4. Bromine

40.  $pH_a$  will be maximum for [RPMT]

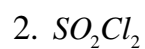
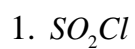
1.  $\text{HClO}_4$       2.  $\text{HClO}_3$       3.  $\text{HClO}_2$       4.  $\text{HClO}$

41. Which is the coordinating solvent in the following reaction? [RPMT]



1. HF      2.  $\text{H}_2\text{O}$       3.  $\text{NH}_3$       4.  $\text{BF}_3$

42. Which of the following product is formed by the reaction of sulphur dioxide with chlorine in presence of sunlight?



VIIA GROUP ELEMENTS PREVIOUS QUESTIONS KEY

1) 2	2) 2	3) 1	4) 3	5) 2	6) 4	7) 2	8) 1	9) 2	10) 4
11) 2	12) 2	13) 3	14) 4	15) 2	16) 2	17) 4	18) 1	19) 2	20) 2
21) 3	22) 2	23) 1	24) 1	25) 3	26) 2	27) 4	28) 2	29) 1	30) 2
31) 2	32) 3	33) 2	34) 2	35) 4	36) 3	37) 1	38) 1	39) 2	40) 4
41) 1	42) 2								

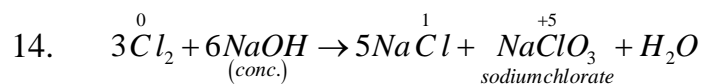
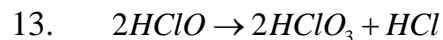


VIIA GROUP ELEMENTS PREVIOUS QUESTIONS SOLUTIONS

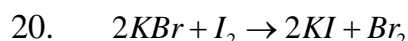
- Helium (He) is a noble and monoatomic gas.
- Commercially chlorine dioxide is prepared by passing  $SO_2$  gas into a mixture of sodium chlorate and  $H_2SO_4$  having NaCl in traces.
- As the oxidation number of Cl-atom increases from HClO to  $HClO_4$  (i.e., +1 to +7), the possibility of getting H atom as  $H^+$  ion by the rupture of O – H bond increases. Hence, the correct order acidity is  $H\overset{+1}C\overset{+2}l\overset{+3}O < H\overset{+1}C\overset{+2}l\overset{+3}O_2 < H\overset{+1}C\overset{+2}l\overset{+3}O_3 < H\overset{+1}C\overset{+2}l\overset{+3}O_4$
- In moist condition it releases nascent oxygen that can act as a bleaching agent
- Fluorine is not prepared by general methods used for the preparation of  $Cl_2$  and  $Br_2$  because HF cannot be easily oxidised to (Fluorine is the most electronegative element).
- Fluorine reacts with water to give both  $O_2$  and  $O_3$ .



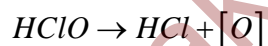
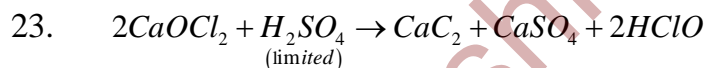
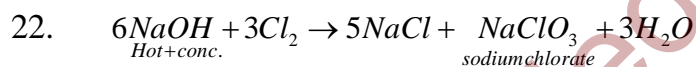
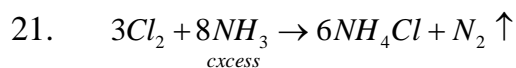
- Fluorine is the most reactive of all the halogens due to its low bond dissociation enthalpy. Hence, Reason is the correct explanation of Assertion.
- F is the most electronegative atom. So, it cannot exhibit positive oxidation state.
- $F_2$  is the most powerful oxidising agent among halogens.
- $Ca(OH)_2 + Cl_2 \rightarrow Ca(\underset{\text{bleaching power}}{OCl})Cl + H_2O$



19. In general, higher the oxidation state more is the covalent character of the oxide.  $I_2O_7$  and  $I_2O_9$  do not exist.  $I_2O_4$  is ionic in nature. It is in fact iodyl iodate  $[IO]^+ [IO_3]^-$ . The only covalent oxide of iodine is  $I_2O_5$ .

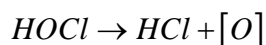


Reaction is not possible because  $Br^-$  ion is not oxidised  $Br_2$  with  $I_2$  due to higher electrode potential of  $I_2$  than bromine.



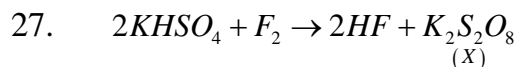
On account of evolution of nascent oxygen, it acts as an oxidising and bleaching agent

25. Chlorine reacts slowly with  $H_2O$  to form HCl and HOCl. The HOCl then decomposes into HCl and [O] radicals.



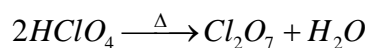
This nascent oxygen is very strong oxidising as well as effective bleaching agent in aqueous solution of  $Cl_2$  or hypochlorite salt.

26. 50% (by mass) alcohol solution of iodine is called tincture of iodine. It is used as an antiseptic.



28. The solubility of  $I_2$  in water increases by the addition of KI due to formation of polyhalide ion, i.e.,  $I_3^-$ .  $KI + I_2 \rightarrow KI_3$

29. Chlorine heptoxide ( $Cl_2O_7$ ) is the anhydride of perchloric acid



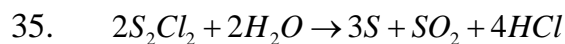
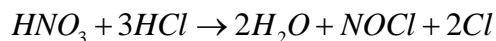
30. Fluorine has the highest  $E_{red}^0$  (equal to +2.9 V) due to which it can easily accept an electron and hence it the best oxidising agent.

31. Bromine liberates iodine from KI solution because of its oxidising property. Colour of iodine is grey black so, black colour is obtained.

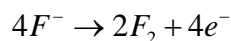


33. Bleaching power is  $Ca(OCl)Cl$  or  $CaOCl_2$ .

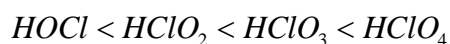
34. The mixture of one part of conc.  $HNO_3$  and three parts of conc.  $HCl$  is known as aqua regia. It contains  $NOCl$ .



36. In Whytlaw-Gray's method fluorine is obtained by electrolysis of molten  $KHF_2$  in a cell made of Cu, Ni or monel metal.



37. Perchloric acid ( $HClO_4$ ) is the strongest acid among these.
38.  $HClO_4$  is stronger acid than  $HClO_3$ . The oxidation number of Cl in  $HClO_4$  is +7 and in  $HClO_3$  is +5. The acid strength of oxyacid of the same halogen increases with the increase in oxidation number of halogen.

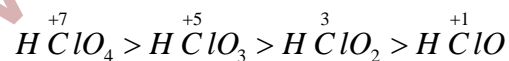


It can also be explained on the basis of presence of oxygen atoms. The acidity of acid increases with increase in number of oxygen atoms as the electronegative (powerful electron withdrawing group) weakens the – OH bond and thus proton can be donated easily.

39. Nitric acid oxidise iodine into iodic acid ( $HIO_3$ )



40. The correct order of acidity of these acids is



41. HF acts as a coordinating solvent. It loses proton and  $F^-$  forms coordinate bond with  $BF_3$ .

42.  $SO_2 + Cl_2 \xrightarrow{h\nu} SO_2Cl_2$   
*sulphuryl chloride*