# DPP - Daily Practice Problems

## Chapter-wise Sheets

Date : | Start Time : | End Time :

# CHEMISTRY CC21

**SYLLABUS :** p-Block Elements (Group 15, 16, 17 and 18)

**Max. Marks : 180** **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

**INSTRUCTIONS** : This Daily Practice Problem Sheet contains 45 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

**1.** The brown ring test for $NO_2^-$ and $NO_3^-$ is due to the formation of complex ion with a formula
(a) $[Fe(H_2O)_6]^{2+}$ (b) $[Fe(NO)(CN)_5]^{2+}$
(c) $[Fe(H_2O)_5NO]^{2+}$ (d) $[Fe(H_2O)(NO)_5]^{2+}$

**2.** Which of the following shows nitrogen with its increasing order of oxidation number?
(a) $NO < N_2O < NO_2 < NO_3^- < NH_4^+$
(b) $NH_4^+ < N_2O < NO_2 < NO_3^- < NO$
(c) $NH_4^+ < N_2O < NO < NO_2 < NO_3^-$
(d) $NH_4^+ < NO < N_2O < NO_2 < NO_3^-$

**3.** Which one of the following is the correct decreasing order of boiling point?
(a) $H_2Te > H_2O > H_2Se > H_2S$
(b) $H_2O > H_2S > H_2Se > H_2Te$
(c) $H_2Te > H_2Se > H_2S > H_2O$
(d) $H_2O > H_2Te > H_2Se > H_2S$

**4.** The true statement for the acids of phosphorus. $H_3PO_2$, $H_3PO_3$, and $H_3PO_4$ is :
(a) the order of their acidity is $H_3PO_4 < H_3PO_3 <, H_3PO_2$
(b) all of them are reducing in nature
(c) all of them are tribasic acids
(d) the geometry of phosphorus is tetrahedral in all the three

**5.** The acid which forms two series of salts is
(a) $H_3PO_4$ (b) $H_3PO_3$ (c) $H_3BO_3$ (d) $H_3PO_2^-$

| RESPONSE GRID | 1. ⓐⓑⓒⓓ | 2. ⓐⓑⓒⓓ | 3. ⓐⓑⓒⓓ | 4. ⓐⓑⓒⓓ | 5. ⓐⓑⓒⓓ |
|---|---|---|---|---|---|

*Space for Rough Work*

6. The nitrogen oxides that contain(s) N–N bond(s) is /are
(i) $N_2O$ (ii) $N_2O_3$ (iii) $N_2O_4$ (iv) $N_2O_5$
(a) (i), (ii) (b) (ii), (iii), (iv)
(c) (iii), (iv) (d) (i), (ii) and (iii)

7. The geometry of $ClO_3^-$ according to valence shell electron pair repulsion (VSEPR) theory will be
(a) planar triangle (b) pyramidal
(c) tetrahedral (d) square planar

8. It is possible to obtain oxygen from air by fractional distillation because
(a) oxygen is in a different group of the periodic table from nitrogen
(b) oxygen is more reactive than nitrogen
(c) oxygen has higher b.p. than nitrogen
(d) oxygen has a lower density than nitrogen

9. Which of the following is the most basic oxide?
(a) $Sb_2O_3$ (b) $Bi_2O_3$ (c) $ScO_2$ (d) $Al_2O_3$

10. Which compound is used in photography?
(a) $Na_2SO_5$ (b) $Na_2S_2O_8$
(c) $Na_2S_2O_6$ (d) $Na_2S_2O_3$

11. The oxyacid of phosphorous in which phosphorous has the lowest oxidation state is
(a) hypophosphorous acid
(b) orthophosphoric acid
(c) pyrophosphoric acid
(d) metaphosphoric acid

12. Which of the following statements is not valid for oxoacids of phosphorus?
(a) Orthophosphoric acid is used in the manufacture of triple superphosphate.
(b) Hypophosphorous acid is a diprotic acid.
(c) All oxoacids contain tetrahedral four coordinated phosphorus.
(d) All oxoacids contain atleast one P = O and one P — OH group.

13. Which one of the following reactions of xenon compounds is not feasible?
(a) $3XeF_4 + 6H_2O \longrightarrow 2Xe + XeO_3 + 12HF + 1.5O_2$
(b) $2XeF_2 + 2H_2O \longrightarrow 2Xe + 4HF + O_2$
(c) $XeF_6 + RbF \longrightarrow Rb[XeF_7]$
(d) $XeO_3 + 6HF \longrightarrow XeF_6 + 3H_2O$

14. The compound of sulphur that can be used as refrigerant is
(a) $SO_2$ (b) $SO_3$ (c) $S_2Cl_2$ (d) $H_2SO_4$

15. Which of the following on thermal decomposition gives oxygen gas ?
(a) $Ag_2O$ (b) $Pb_3O_4$
(c) $PbO_2$ (d) All of these

16. Which of the following statements are correct?
(i) Arsenic and antimony are metalloids.
(ii) Phosphorus, arsenic and antimony are found mainly as sulphide minerals.
(iii) Covalent radii increases equally from N to Bi.
(iv) Elements of group 15 have extra stability and higher ionisation energy due to exactly half filled $ns^2np^3$ electronic configuration.
(v) In group 15 elements only nitrogen is gas whereas all others are solids.
(a) (i), (iv) and (v) (b) (ii), (iii) and (iv)
(c) (i), (ii) and (iii) (d) (ii), (iii) and (v)

17. The formation of $O_2^+[PtF_6]^-$ is the basis for the formation of xenon fluorides. This is because
(a) $O_2$ and Xe have comparable sizes
(b) both $O_2$ and Xe are gases
(c) $O_2$ and Xe have comparable ionisation energies
(d) Both (a) and (c)

| RESPONSE GRID | | | | | |
|---|---|---|---|---|---|
| | 6. ⓐⓑⓒⓓ | 7. ⓐⓑⓒⓓ | 8. ⓐⓑⓒⓓ | 9. ⓐⓑⓒⓓ | 10. ⓐⓑⓒⓓ |
| | 11. ⓐⓑⓒⓓ | 12. ⓐⓑⓒⓓ | 13. ⓐⓑⓒⓓ | 14. ⓐⓑⓒⓓ | 15. ⓐⓑⓒⓓ |
| | 16. ⓐⓑⓒⓓ | 17. ⓐⓑⓒⓓ | | | |

*Space for Rough Work*

18. Oxidation of thiosulphate by iodine gives
(a) tetrathionate ion (b) sulphide ion
(c) sulphate ion (d) sulphite ion

19. The hybridization in $ICl_7$ is
(a) $sp^3d^3$ (b) $d^2sp^3$ (c) $sp^3d$ (d) $sp^3$

20. Match the columns.

| | Column-I | | Column-II |
|---|---|---|---|
| A. | $Pb_3O_4$ | I. | Neutral oxide |
| B. | $N_2O$ | II. | Acidic oxide |
| C. | $Mn_2O_7$ | III. | Basic oxide |
| D. | $Bi_2O_3$ | IV. | Mixed oxide |

(a) A – I; B – II; C – III; D – IV
(b) A – IV; B – I; C – II; D – III
(c) A – III; B – II; C – IV; D – I
(d) A – IV; B – III; C – I; D – II

21. Which one of the following arrangements does not give the correct picture of the trends indicated against it?
(i) $F_2 > Cl_2 > Br_2 > I_2$ : Oxidizing power
(ii) $F_2 > Cl_2 > Br_2 > I_2$ : Electron gain enthalpy
(iii) $F_2 > Cl_2 > Br_2 > I_2$ : Bond dissociation energy
(iv) $F_2 > Cl_2 > Br_2 > I_2$ : Electronegativity.
(a) (ii) and (iv) (b) (i) and (iii)
(c) (ii)and(iii) (d) (ii), (iii)and(iv)

22. Which of the following is a saline oxide ?
(a) $Na_2O_2$ (b) $BaO_2$ (c) $Na_2O$ (d) $Fe_2O_3$

23. Shape of $XeOF_4$ is
(a) octahedral (b) square pyramidal
(c) pyramidal (d) T-shaped

24. Which among the following is paramagnetic ?
(a) $Cl_2O$ (b) $ClO_2$ (c) $Cl_2O_7$ (d) $Cl_2O_6$

25. The molecule having smallest bondangle is :
(a) $NCl_3$ (b) $AsCl_3$ (c) $SbCl_3$ (d) $PCl_3$

26. Which one of the following orders correctly represents the increasing acid strengths of the given acids?
(a) HOClO< HOCl <$HOClO_3$ <$HOClO_2$
(b) $HOClO_2$ < $HOClO_3$ < HOClO< HOCl
(c) $HOClO_3$ < $HOClO_2$ < HOClO <HOCl
(d) HOCl < HOClO < $HOClO_2$ < $HOClO_3$

27. The ease of liquefaction of noble gases increases in the order
(a) He<Ne<Ar<Kr<Xe
(b) Xe<Kr<Ne<Ar<He
(c) Kr < Xe < He < Ne<Ar
(d) Ar<Kr<Xe<Ne < He

28. A certain compound (X) when treated with copper sulphate solution yields a brown precipitate. On adding hypo solution, the precipitate turns white. The compound is
(a) $K_2CO_3$ (b) KI (c) KBr (d) $K_3PO_4$

29. Which of the following species is not a pseudo halide
(a) $CNO^-$ (b) $RCOO^-$ (c) $OCN^-$ (d) $NNN^-$

30. Which of the following is used to produce and sustain powerful superconducting magnets to form an essential part of NMR spectrometer ?
(a) Ar (b) Ne (c) Rn (d) He

31. The product obtained as a result of a reaction of nitrogen with $CaC_2$ is
(a) $Ca(CN)_2$ (b) CaCN (c) $CaCN_3$ (d) $Ca_2CN$

32. Which of the following noble gases has the highest negative electron gain enthalpy value?
(a) Helium (b) Krypton
(c) Argon (d) Neon

| RESPONSE GRID | | | | | |
|---|---|---|---|---|---|
| | 18. ⓐⓑⓒⓓ | 19. ⓐⓑⓒⓓ | 20. ⓐⓑⓒⓓ | 21. ⓐⓑⓒⓓ | 22. ⓐⓑⓒⓓ |
| | 23. ⓐⓑⓒⓓ | 24. ⓐⓑⓒⓓ | 25. ⓐⓑⓒⓓ | 26. ⓐⓑⓒⓓ | 27. ⓐⓑⓒⓓ |
| | 28. ⓐⓑⓒⓓ | 29. ⓐⓑⓒⓓ | 30. ⓐⓑⓒⓓ | 31. ⓐⓑⓒⓓ | 32. ⓐⓑⓒⓓ |

*Space for Rough Work*

**33.** 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) a gas cannot conduct electricity but a liquid can
(c) HCl gas does not obey Ohm's law, whereas the solution does
(d) HCl ionises in aqueous solution

**34.** Density of nitrogen gas prepared from air is slightly greater than that of nitrogen prepared by chemical reaction from a compound of nitrogen due to the presence of
(a) argon
(b) carbon dioxide
(c) some $N_3$ molecules analogous to $O_3$
(d) greater amount of $N_2$ molecules derived from N-15 isotope

**35.** The correct order of acidic strength is
(a) $Cl_2O_7 > SO_2 > P_4O_{10}$
(b) $CO_2 > N_2O_5 > SO_3$
(c) $Na_2O > MgO > Al_2O_3$
(d) $K_2O > CaO > MgO$

**36.** Sulphur trioxide can be obtained by which of the following reaction :

(a) $CaSO_4 + C \xrightarrow{\Delta}$ (b) $Fe_2(SO_4)_3 \xrightarrow{\Delta}$

(c) $S + H_2SO_4 \xrightarrow{\Delta}$ (d) $H_2SO_4 + PCl_5 \xrightarrow{\Delta}$

**37.** The correct order of increasing bond angles in the following species are :

(a) $Cl_2O < ClO_2 < ClO_2^-$

(b) $ClO_2 < Cl_2O < ClO_2^-$

(c) $Cl_2O < ClO_2^- < ClO_2$

(d) $ClO_2^- < Cl_2O < ClO_2$

**38.** Which one of the following oxides of chlorine is obtained by passing dry chlorine over silver chlorate at 90°C ?
(a) $Cl_2O$ (b) $ClO_3$ (c) $ClO_2$ (d) $ClO_4$

**39.** The shape of $XeO_2F_2$ molecule is
(a) trigonal bipyramidal (b) square planar
(c) tetrahedral (d) see-saw

**40.** Number of lone pairs of electrons on Xe atoms $XeF_2$, $XeF_4$ and $XeF_6$ molecules are respectively
(a) 3, 2 and 1 (b) 4, 3 and 2
(c) 2, 3 and 1 (d) 3, 2 and 0

**41.** Match the interhalogen compounds of column-I with the geometry in column II and assign the correct code.

| Column-I | | Column-II |
|---|---|---|
| A. | $XX'$ | I. T-shape |
| B. | $XX'_3$ | II. Pentagonal bipyramidal |
| C. | $XX'_5$ | III. Linear |
| D. | $XX'_7$ | IV. Square-pyramidal |
| | | V. Tetrahedral |

(a) A – III; B – I; C – IV; D – II
(b) A – V; B – IV; C – III; D – II
(c) A – IV; B – III; C – II; D – I
(d) A – III; B – IV; C – I; D – II

**42.** The crystals of ferrous sulphate on heating give :

(a) $FeO + SO_2 + H_2O$

(b) $FeO + SO_3 + H_2SO_4 + H_2O$

(c) $Fe_2O_3 + SO_2 + H_2SO_4 + H_2O$

(d) $Fe_2O_3 + H_2SO_4 + H_2O$

**43.** One mole of fluorine is reacted with two moles of hot and concentrated KOH. The products formed are KF, $H_2O$ and $O_2$. The molar ratio of KF, $H_2O$ and $O_2$ respectively is
(a) 1 : 1 : 2 (b) 2 : 1 : 0.5
(c) 1 : 2 : 1 (d) 2 : 1 : 2

**44.** A greenish yellow gas reacts with an alkali metal hydroxide to form a halate which can be used in fire works safety matches. The gas and halate respectively are
(a) $Br_2, KBrO_3$ (b) $Cl_2, KClO_3$
(c) $I_2, NaIO_3$ (d) $Cl_2, NaClO_3$

**45.** Yellow ammonium sulphide is
(a) $(NH_4)_2S_8$ (b) $(NH_4)_2S$
(c) $(NH_4)_2S_x$ (d) $(NH_4)_2S_4$

| RESPONSE GRID | | | | | |
|---|---|---|---|---|---|
| | **33.** ⓐⓑⓒⓓ | **34.** ⓐⓑⓒⓓ | **35.** ⓐⓑⓒⓓ | **36.** ⓐⓑⓒⓓ | **37.** ⓐⓑⓒⓓ |
| | **38.** ⓐⓑⓒⓓ | **39.** ⓐⓑⓒⓓ | **40.** ⓐⓑⓒⓓ | **41.** ⓐⓑⓒⓓ | **42.** ⓐⓑⓒⓓ |
| | **43.** ⓐⓑⓒⓓ | **44.** ⓐⓑⓒⓓ | **45.** ⓐⓑⓒⓓ | | |

*Space for Rough Work*

**1.** **(c)** $[Fe(H_2O)_5NO]^{2+}$ ion is formed.

**2.** **(c)**

| Compound | O.S. of N |
|---|---|
| $N_2O$ | +1 |
| NO | +2 |
| $NO_2$ | +4 |
| $NO_3^-$ | +5 |
| $NH_4^+$ | −3 |

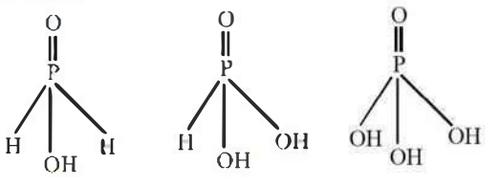
Therefore increasing order of oxidation state of N is:

$NH_4^+ < N_2O < NO < NO_2 < NO_3^-$.

**3.** **(d)** Among the hydrides of group 16 elements, boiling point of $H_2O$ is higher than $H_2S$ (difference in boiling points of $H_2O$ and $H_2S$ is around 200°C) because of strong intermolecular hydrogen bonding. After the decrease in boiling point from $H_2O$ to $H_2S$, from $H_2S$ to $H_2Te$, it increases due to increase in size of the atoms from S to Te which increases the magnitude of van der Waal's forces among the molecules. So, the correct order of boiling points is

$H_2O > H_2Te > H_2Se > H_2S$

**4.** **(d)** (i) The geometry of phosphorus is tetrahedral in all the three.



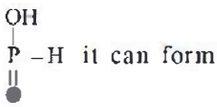
$H_3PO_2$ $H_3PO_3$ $H_3PO_4$

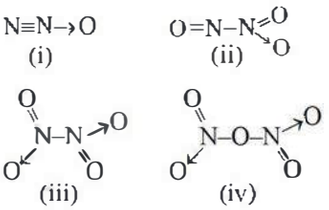
(ii) The acidity increases with increase in oxidation number of central atom

$\overset{+1}{H_3PO_2} < \overset{+3}{H_3PO_3} < \overset{+5}{H_3PO_4}$

(iii) $H_3PO_4$ is not reducing.

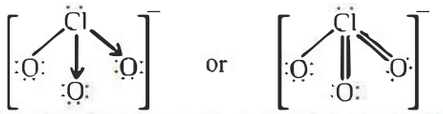
(iv) $H_3PO_3$ is diabasic, while $H_3PO_2$ is monobasic.

**5.** **(b)**  it can form two series of salts by replacement of H attached to oxygen

**6.** **(d)** 

(i) (ii) (iii) (iv)

**7.** **(b)** Hybridisation is $sp^3$ and shape pyramidal

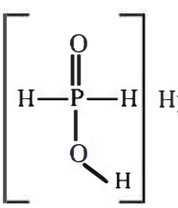


**8.** **(c)** Air is liquified by making use of the joule-Thomson effect (cooling by expansion of the gas). Water vapour and $CO_2$ are removed by solidification. The remaining constituents of liquid air i.e., liquid oxygen and liquid nitrogen are separated by means of fractional distillation (b.p. of $O_2 = -183°C$ : b.P. of $N_2 = -195.8°C$).

**9.** **(b)** More the oxidation state of the central atom (metal) more is its acidity. Hence $SeO_2$ (O. S. of Se = +4) is acidic. Further for a given O.S., the basic character of the oxides increases with the increasing size of the central atom. Thus $Al_2O_3$ and $Sb_2O_3$ are amphoteric and $Bi_2O_3$ is basic.

**10.** **(d)**

**11.** **(a)** Hypophosphorous acid is $H_3PO_2$ in which O.S. of P is +1.

**12.** **(b)**  Hypophosphorous acid ($H_3PO_2$) is a monobasic acid. i.e., it has only one ionisable hydrogen atom or one OH is present.

**13.** **(d)** The products of the concerned reaction react each other forming back the reactants.

$XeF_6 + 3H_2O \longrightarrow XeO_3 + 6HF$.

**14.** **(a)** Due to large enthalpy of vaporisation $SO_2$ can be used as refrigerant.

**15.** **(d)** $2Ag_2O(s) \rightarrow 4Ag(s) + O_2(g)$

$2Pb_3O_4(s) \rightarrow 6PbO(s) + O_2(g)$

$2PbO_2(s) \rightarrow 2PbO(s) + O_2(g)$

**16.** **(a)** Phosphorus occurs in minerals of the apatite family, $Ca_9(PO_4)_6$, $CaX_2$ (X = F, Cl or OH) which are main components of phosphate rocks whereas arsenic and antimony are found as sulphide minerals. The increase in covalent radii from N to P is greater in comparison to increase from As to Bi.

**17.** **(d)** (i) The first ionization energy of xenon (1, 170 kJ $mol^{-1}$) is quite close to that of dioxygen (1,180 kJ $mol^{-1}$).

(ii) The molecular diameters of xenon and dioxygen are almost identical.

Based on the above similarities Barlett (who prepared $O_2^+[PtF_6]^-$ compound) suggested that since oxygen combines with $PtF_6$, so xenon should also form similar compound with $PtF_6$.

**18.** **(a)** $2S_2O_3^{2-} + I_2 \rightarrow \underset{\text{Tetrathionate}}{S_4O_6^{2-}} + 2I^-$

**19.** **(a)** $ICl_7$. The hybridisation is $\frac{1}{2}(7+7+0-0) = 7\ (sp^3d^3)$

**20.** **(b)**

**21.** **(c)** From the given options we find option (i) is correct. The oxidising power of halogens follow the order $F_2 > Cl_2 > Br_2 > I_2$. Option (ii) is incorrect because it in not the correct order of electron gain enthalpy of halogens.
The correct order is $Cl_2 > F_2 > Br_2 > I_2$. The low value of $F_2$ than $Cl_2$ is due to its small size.
Option (iii) is incorrect. The correct order of bond dissociation energies of halogens is
$Cl_2 > Br_2 > F_2 > I_2$.
Option (iv) is correct. It is the correct order of electronegativity values of halogens. Thus option (ii) and (iii) are incorrect.

**22.** **(c)** Oxides which are more ionic in nature (salt - like) are known as saline oxides e.g. oxides of alkali metals.

**23.** **(b)** $XeOF_4$ square pyramidal.

**24.** **(b)** $ClO_2$ contains 7 + 12 i.e. 19 electrons (valence) which is an odd number, i.e. there is (are) free electron(s). Hence it is paramagnetic in nature.

**25.** **(c)** All the members form volatile halides of the type $AX_3$. All halides are pyramidal in shape. The bond angle decreases on moving down the group due to decrease in bond pair-bond pair repulsion.

| $NCl_3$ | $PCl_3$ | $AsCl_3$ | $SbCl_3$ |
|---|---|---|---|
| 107° | 109.5° | 98° | 97.2° |

**26.** **(d)** $\underset{+1}{HOCl} < \underset{+3}{HOClO} < \underset{+5}{HOClO_2} < \underset{+7}{HOClO_3}$
In case of oxyacids of similar element as the oxidation number of the central atom increases, strength of acid also increases.

**27.** **(a)** As size increases, van der Waal's forces of attraction between noble gas atoms also increases. Consequently, ease of their liquefaction increases.

**28.** **(b)** KI reacts with $CuSO_4$ solution to produce cuprous iodide (white precipitate) and $I_2$ (which gives brown colour). Iodine reacts with hypo ($Na_2S_2O_3.5H_2O$) solution. Decolourisaiton of solution shows the appearance of white precipitate.

$$2CuSO_4 + 4KI \rightarrow 2K_2SO_4 + \underset{\substack{\text{Cuprous iodide}\\\text{(White ppt.)}}}{2CuI} + \underset{\substack{\text{(Brown colour}\\\text{in solution)}}}{I_2}$$

$$2Na_2S_2O_3 + I_2 \longrightarrow \underset{\substack{\text{Sod. tetra}\\\text{thionate}\\\text{(colourless)}}}{Na_2S_4O_6} + 2NaI$$

**29.** **(b)** $RCOO^-$ is not pseudo halide.

**30.** **(d)**

**31.** **(a)** (Bonus)
$CaC_2 + N_2 \rightarrow Ca(CN)_2 + C$

**32.** **(d)** Electron gain enthalpy for noble gases is positive and it becomes less positive with increase in size of atom. Value of electron gain enthalpy
He– 48 kJmol$^{-1}$, Ne– 116 kJmol$^{-1}$
Ar, Kr – 96 kJ mol$^{-1}$, Xe – 77 kJ mol$^{-1}$
Hence, Ne has highest negative electron gain enthalpy.

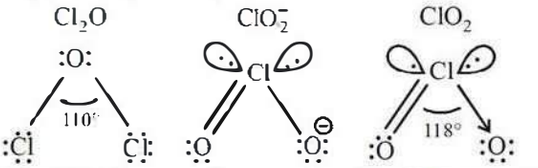
**33.** **(d)** In gaseous state the HCl is covalent in nature while in aqueous solution it ionises to give $H^+$ and $Cl^-$ ions.

**34.** **(a)** Air contains about 1% inert gases, mainly Ar (At.wt = 40). The atomic wt. of $N_2$ is 28.

**35.** **(a)** Non-metallic oxides are acidic and acidic character decreases with decreasing non-metallic character.

**36.** **(b)** $Fe_2(SO_4)_3 \xrightarrow{\Delta} Fe_2O_3 + SO_3$

**37.** **(c)** The correct order of increasing bond angle is
$Cl_2O < ClO_2^- < ClO_2$

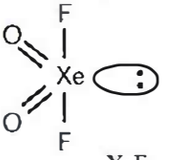



* In $ClO_2^-$ there are 2 lone pairs of electrons present on the central chlorine atom. Therefore the bond angle in $ClO_2^-$ is less than 118° which is the bond angle in $ClO_2$ which has less number of electrons on central chlorine atom.

**38.** **(c)** Pure $ClO_2$ is obtained bypassing dry $Cl_2$ over $AgClO_3$ at 90°C.

$$2AgClO_3 + Cl_2(\text{dry}) \xrightarrow{90°C} 2AgCl + 2ClO_2 + O_2$$

**39.** **(d)** $XeO_2F_2$ has trigonal bipyramidal geometry, but due to presence of lone pair of electrons on equitorial position, its actual shape is *see-saw*.




**40.** **(a)**

| | $XeF_2$ | $XeF_4$ | $XeF_6$ |
|---|---|---|---|
| Valence electrons of Xe | 8 | 8 | 8 |
| Electrons involved in bond formation | 2 | 4 | 6 |
| Lone pairs left | 3 | 2 | 1 |

**41.** **(a)** $XX' \rightarrow$ Linear (e.g. ClF, BrF)
$XX_3' \rightarrow$ T-Shape (e.g. $ClF_3$, $BrF_3$)
$XX_5' \rightarrow$ Square pyramidal (e.g. $BrF_5$ $IF_5$)
$XX_7' \rightarrow$ Pentagonal bipyramidal (e.g. $IF_7$)

**42.** **(c)** $FeSO_4.7H_2O \rightarrow FeSO_4 + 7H_2O$

$$2FeSO_4 \xrightarrow{\Delta} Fe_2O_3 + SO_2 + SO_3$$

**43.** **(b)** $2F_2 + 4KOH \rightarrow 4KF + O_2 + 2H_2O$ for 1 mole of $F_2$ the molar ratio.

| $F_2$ | KOH | KF | $O_2$ | $H_2O$ |
|---|---|---|---|---|
| 1 | 2 | 2 | $\frac{1}{2}$ | 1 |

**44.** **(b)** $3Cl_2 + 6KOH \rightarrow KClO_3 + 5KCl + 3H_2O$
$KClO_3$ is used in fire works and safety matches and $Cl_2$ is greenish yellow gas.

**45.** **(c)** Yellow ammonium sulphide is $(NH_4)_2S_x$.