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TARGET : JEE (ADVANCED) 2015

Course : VIJETA & VIJAY (JPAD & JRAD) Date : 21-04-2015

INORGANIC CHEMISTRY
DPP
DAILY PRACTICE PROBLEMS
NO. 05

TEST INFORMATION

DATE : 22.04.2015 PART TEST (PT) - 02

Syllabus : Organic : Organic Nomenclature, Isomerism, Stereoisomerism, GOC, POC, Tautomerism, Acids & Bases. **Physical :** Gaseous State, Solid State, Surface Chemistry, Thermodynamics & Thermochemistry.

DPP No. # 05 (JEE-ADVANCED)

Total Marks : 170 **Max. Time : 137 min.**

Single choice Objective (–1 negative marking) Q.1 to Q.14	**(3 marks 2½ min.)**	**[42, 35]**
Multiple choice objective (–1 negative marking) Q.15 to Q.19	**(4 marks, 3 min.)**	**[20, 15]**
Assertion and Reason ('–1' negative marking) Q.20 to Q.22	**(3 marks 2½ min.)**	**[09, 7½]**
Comprehension (–1 negative marking) Q.23 to Q.31	**(3 marks 2½ min.)**	**[27, 22½]**
Single Digit Subjective Questions (no negative marking) Q.32 to Q.39	**(4 marks 2½ min.)**	**[32, 20]**
Double Digits Subjective Questions (no negative marking) Q.40 to Q.41	**(4 marks 2½ min.)**	**[08, 05]**
Match the column (4 vs 4) (no negative marking) Q.42 to Q.45	**(8 marks, 8 min.)**	**[32, 32]**

1. F_2 + dil NaOH $\longrightarrow$ A + NaF + H_2O ; F_2 + conc. NaOH $\longrightarrow$ B + NaF + H_2O
A and B respectively are :
(A) OF_2 and O_2 (B) O_2 and OF_2 (C) Both O_2 (D) Both OF_2

2. When F_2 is passed into a solution of mineral acid X, a greenish yellow gas Y is formed. Which on treating with slaked lime forms "Z". When Red litmus is kept in contact with Z, it changes into
(A) Blue colour (B) No change in colour (C) White in colour (D) None of these

3. By which of the following methods, H_2O_2 can't be synthesised ?
(A) Addition of ice cold H_2SO_4 on BaO_2 (B) Addition of ice cold H_2SO_4 on PbO_2
(C) Aerial oxidation of 2-ethyl anthraquinol (D) Electrolysis of $(NH_4)_2SO_4$ at a high current density

4. On hydrolysis of compound A, two acids P and Q forms. P is used in etching of glass, Q on strongly heating gives oxide R. R is used in estimation of carbon monoxide. A is.
(A) PF_3 (B) IF_5 (C) NF_3 (D) ClF_3

5. One gas bleaches the colour of flowers by reduction, while the other by oxidation, the two gases respectively may be :
(A) CO and Cl_2 (B) H_2S and Br_2 (C) NH_3 and SO_3 (D) SO_2 and Cl_2

6. SbF_5 reacts with XeF_4 to form an adduct. The shapes of cation and anion in the adduct are respectively :
(A) square planar, trigonal bipyramidal (B) T-shaped, octahedral
(C) square pyramidal, octahedral (D) square planar, octahedral

7. Consider the following transformations :
(I) $XeF_6 + NaF \longrightarrow \overset{\oplus}{Na}[XeF_7]^-$ (II) $2PCl_5(s) \longrightarrow [PCl_4]^{\oplus}[PCl_6]^{\ominus}$
(III) $[Al(H_2O)_6]^{3+} + H_2O \longrightarrow [Al(H_2O)_5OH]^{2+} + H_3O^+$
Possible transformations are :
(A) I, II, III (B) I, III (C) I, II (D) II, III

8. Which of the following statements are correct about the reaction between the copper metal and concentrated HNO_3?
(I) The principal reducing product is NO gas.
(II) Cu metal is oxidised to Cu^{2+} (aq.) ion which is blue in colour.
(III) All HNO_3 used act as oxdising agent. (IV) The principal reducing product is NO_2 gas.
(A) I, II, III (B) I, II (C) II, IV (D) All the above

9. $Cl_2(g) + Ba(OH)_2 \xrightarrow{\Delta} X(aq.) + BaCl_2 + H_2O$

$X + H_2SO_4 \longrightarrow Y + BaSO_4$

$Y \xrightarrow[\Delta > 365K]{\Delta} Z(green) + H_2O + O_2$

Y and Z are respectively :

(A) $HClO_4$, ClO_2 (B) $HClO_3$, ClO_2 (C) $HClO_3$, Cl_2O_6 (D) $HClO_4$, Cl_2O_7

10. A substance (P), when heated in a dry test tube, liberated a colourless odourless gas that rekindled a glowing splinter. It may be :

(A) $KClO_3$ (B) NaN_3 (C) K_2SO_3 (D) $CaCO_3$

11. Consider the following metallurgical processes :

(I) Heating impure metal with CO and distilling the resulting volatile carbonyl (b.p. 43°C) and finally decomposition at 150°–200°C to get the pure metal

(II) Heating the sulphide ore in air until a part is converted to oxide and then further heating in the absence of air to let the oxide react with unchanged metal sulphide

(III) Electrolysis of the molten electrolyte containing approximately equal amounts of the metal chloride and NaCl to obtained the metal

The processes used for obtaining magnesium, nickel and copper are respectively.

(A) (I), (II) and (III) (B) (II), (III) and (I) (C) (III), (I) and (II) (D) (II), (I) and (III)

12. Give the correct order of initials T or F for following statements. Use T if statement is true and F if it is false.

(i) In Gold Schmidt's thermite process aluminium acts as a reducing agent.

(ii) Mg is extracted by electrolysis of aq. solution of $MgCl_2$.

(iii) Extraction of Pb is possible by smelting of its oxide.

(iv) Red Bauxite is purified by Serpeck's process.

(A) T T T F (B) T F F T (C) F T T T (D) T F T F

13. Sodium carbonate cannot react with :

(A) $MgCl_2$ (aq.) (B) $Ca(HCO_3)_2$ (C) H_2SO_4 (D) dry CO_2

14. ΔG° vs T plot in the Ellingham's diagram slopes downward for the reaction

(A) $Mg + O_2 \rightarrow MgO$ (B) $2Ag + O_2 \rightarrow Ag_2O$ (C) $C + O_2 \rightarrow CO$ (D) $CO + O_2 \rightarrow CO_2$

15. Aqueous solution of boric acid is treated with salicylic acid. Which of the following statements is/are incorrect for the product formed in the above reaction ?

(A) no product will be formed because both are acids.

(B) product is 4-coordinated complex and optically resolvable.

(C) product is 4-coordinated complex and optically non-resolvable.

(D) there are two newly formed five membered rings.

16. $NH_3(excess) + Cl_2 \longrightarrow NH_4Cl + A(gas)$; $NH_3 + Cl_2(excess) \longrightarrow B + HCl$

Correct statement regarding A and B.

(A) A is highly reactive gas at room temperature.

(B) Bond order of gas 'A' is similar to C_2^{2-}.

(C) Compound 'B' is explosive.

(D) Bond angle of compound B is higher than bond angle of NF_3.

17. Select the correct statement(s) regarding reaction of SO_2 with PCl_5.

(A) It is a redox reaction.

(B) One of the product is sulphuryl chloride.

(C) Both the products on addition of water produce strongly acidic solutions.

(D) Both the products have same hybridisation of central atom.

18. Froth floatation :

(A) is a physical method of separating mineral from the gangue.

(B) is a method to concentrate the ore depending on the difference in wettability of gangue and the ore.

(C) is used for the sulphide ores.

(D) is a method in which impurities sink to the bottom.

19. $Na_2S_2O_3$ is oxidised to Na_2SO_4 by :

(A) Cl_2 (B) Br_2 (C) I_2 (D) $KMnO_4$

20. **Statement-1 :** Aluminium and zinc metal evolve H_2 gas from NaOH solution.

Statement-2 : Several non-metals such as P,S,Cl, etc. yield a hydride instead of H_2 gas from NaOH.

(A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.

(B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.

(C) Statement-1 is True, Statement-2 is False. (D) Statement-1 is False, Statement-2 is True.

21. **Statement-1 :** Lead, tin and bismuth are purified by liquation method.
Statement-2 : Lead, tin and bismuth have low m.p. as compared to impurities.
(A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
(B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.
(C) Statement-1 is True, Statement-2 is False. (D) Statement-1 is False, Statement-2 is True.

22. **Statement-1 :** $2PbO_2 + H_2SO_4 \longrightarrow 2PbSO_4 + 2H_2O + O_2$ In this reaction H_2SO_4 acts as reducing agent.
Statement-2 : If PbO_2 is considered as lead peroxide then the above reaction is an example of disproportionation.
(A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
(B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.
(C) Statement-1 is True, Statement-2 is False. (D) Statement-1 is False, Statement-2 is True.

Comprehension # 1

A white solid having garlic smell (A) $\xrightarrow[\text{cold}]{H_2O}$ (B) $\xrightarrow[\text{heating}]{\text{on}}$ gas (C) having rotten fish smell + acid (D)

23. A is :
(A) P (White) (B) P (Red) (C) P_2O_3 (D) $(COOH)_2$

24. With increase in temperature following heating, acid (D) produces the following products in which correct sequence ?
(A) Pyro acid , meta acid , anhydride (B) Meta acid , Pyro acid , anhydride
(C) Meta acid , anhydride , pyro acid (D) Pyro acid , anhydride , meta acid

Comprehension # 2

In SF_6 , sulphur is octahedrally hybridized (sp^3d^2). Hence , it is still having some vacant 3d-orbitals to accommodate the nucleophilic attack through the sp^3d^3 (pentagonal bipyramid) hybridization. But the size of sulphur is too small to tolerate the seven co-ordination number.

25. Which of the following product is formed when $BeCl_2$ is hydrolysed in alkaline medium ?
(A) $Be(OH)_2$ (B) $[Be(OH)_4]^{2-}$ (C) $[Be(OH)_2]_n$ (D) None of these

26. The product of hydrolysis of SF_4 and TeF_6 are _____ and _____ respectively.
(A) H_2SO_3 and H_2TeO_4 (B) H_2SO_4 and H_2TeO_4
(C) H_2SO_3 and $Te(OH)_6$ (D) H_2SO_4 and $Te(OH)_6$

Comprehension # 3

A pungent smelling gas 'X' is produced when a salt 'P' is treated with concentrated H_2SO_4. The gas 'X' is colorless and also give dense white fumes with NH_3. The solution of salt P gives white precipitate with $AgNO_3$. The white precipitate dissolves in dilute NH_3.
Gas X gets oxidised by oxygen in the presence of $CuCl_2$ to produce gas 'Y' and liquid 'Z' at room temperature.

27. Which of the following is incorrect about gas X ?
(A) X react readily with sodium carbonate. (B) X is an oxidising agent.
(C) X produces acidic solution in water. (D) X is not oxidised by ferric chloride.

28. Gas Y reacts with hypo solution to produce gas X and species W. W is :
(A) Na_2S (B) Na_2SO_3 (C) $NaHSO_4$ (D) S

Comprehension # 4

The mineral colemanite is fused with sodium carbonate, compound (Z) is obtained along with white ppt. When (Z) reacts with dil. H_2SO_4 gives a compound (A) which on strong heating gives an oxide (C). (C) on reduction with Mg produced (D) and non metal (X). Treatment of chlorine on a mixture of (C) and carbon at high temperature gives a halide (E) which is fuming liquid (b. pt. 13ºC) along with a gas (F). (E) is a Lewis acid.

29. (Z) may be :
(A) H_3BO_3 (B) $BaCO_3$ (C) borax (D) Na_3BO_3

30. (A) and (C) may be :
(A) B_2H_6, B (B) B_2H_6, B_2O_3 (C) H_3BO_3, B (D) H_3BO_3, B_2O_3

31. (E) and (F) will be :
(A) BCl_3, CO (B) Cl_2O, CCl_4 (C) BOCl, CO (D) BCl_3, CCl_4

32. Among the following, the number of compounds, that can act as dehydrating agent is _____.
Conc. H_2SO_4 , anhyd. $CaCl_2$, Conc. HNO_3 , CaO , $CuSO_4.5H_2O$, P_2O_5

33._ The by product of solvay process reacts with Na_2CO_3 to form a compound x, which on heating decomposes to give y. y is absorbed by KO_2. The number of atoms per molecule of y is .....

34._ The number of compounds/elements oxidised by XeF_2 among following is:
HF, HBr, HCl, HI, NH_3, CrF_2, Pt, S_8

35._ How many of the following will turn moist red litmus blue and finally white?
Li_2O, KO_3, RbO_2, Cs_2O_2, BeO, MgO, BaO_2, SrO

36. Among the following, the number of compounds that would require electrolysis process to get their respective metal from their metal compound is _____.
NaCl , Cr_2O_3 , $MgCl_2$, Al_2O_3 , $CaCl_2$, Fe_2O_3

38. How many of the following acids may undergo disproportionation reaction on heating ?
$H_2C_2O_4$, H_3PO_2 , H_3PO_3 , HClO , HNO_2 , H_2SO_3 , H_2SO_4 , $HClO_3$

39._ $SOCl_2$ can react with how many of the following species to liberate SO_2?
H_2O, HCl, C_2H_5OH, HBr, CH_3COOH, HCN, H_2SO_4, H_3PO_4, D_2O, HI, HF

40. H–F is a weak acid but on addition of AsF_5 , it becomes a very strong acid. The number of 90° angles in the anionic part of the product is_____.

41._ $NaOH + PbO \xrightarrow{\Delta} x + H_2O$

$NaOH + SnO_2 \xrightarrow{\Delta} y + H_2O$

$NaOH + H_2O + Al \xrightarrow{\Delta} z + H_2$

Sum of the number of atoms present in one molecule each of x, y, z is.....

42. Match the following :

Column-I	**Column-II**
(A) Borax $\xrightarrow{\Delta}$	(p) BN
(B) $B_2H_6 + H_2O \longrightarrow$	(q) B_2H_6
(C) $B_2H_6 + NH_3$ (excess) $\xrightarrow{\Delta}$	(r) H_3BO_3
(D) $BCl_3 + LiAlH_4 \longrightarrow$	(s) $NaBO_2 + B_2O_3$

43. Match the following :

Column-I (Reaction)	**Column-II (Product's character)**
(A) $NaNO_3 \xrightarrow[500^oC]{\Delta}$	(p) Diamagnetic.
(B) $K + O_2$ (excess) $\longrightarrow$ (Major)	(q) Paramagnetic.
(C) $Na + O_2$ (excess) $\longrightarrow$ (Major)	(r) Bond order 1
(D) K (dissolved in liquid NH_3) $\xrightarrow{\text{Blue solution}}$	(s) Bond order 1.5

44. Match the compound with effect of heating it.

Column- I	**Column- II**
(A) NH_4ClO_4	(p) Leaves no residue on heating
(B) $(NH_4)_2CO_3$	(q) Reaction occurring is a redox reaction.
(C) $(NH_4)_2Cr_2O_7$	(r) Produces N_2 on heating.
(D) Mg $(NH_4)PO_4$	(s) Produces NH_3 on heating.

45.

Column-I (Gas)	**Column-II (Properties of gas)**
(A) BF_3	(p) Gets oxidised by acidic $KMnO_4$
(B) HCl	(q) Dissolves significantly in aqueous KOH
(C) SO_2	(r) Changes color of litmus solution
(D) F_2	(s) Colorless gas

Solution of DPP # 5

TARGET : JEE (ADVANCED) 2015

Course : VIJETA & VIJAY (ADP & ADR)

CHEMISTRY

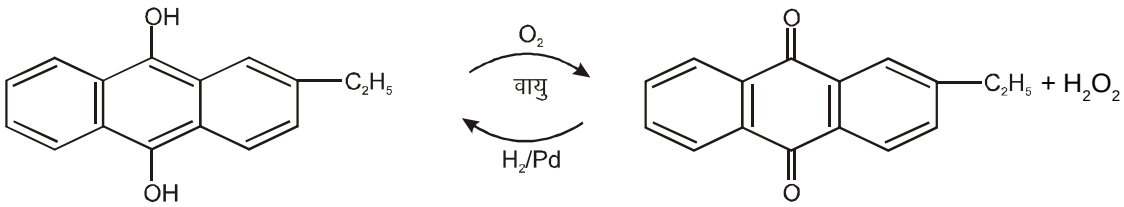
2. $F_2 + \underset{(X)}{HCl} \longrightarrow HF + \underset{(Y)}{Cl_2}$; Cl_2 is greenish yellow gas.

$\underset{(Y)}{2Cl_2} + 3(a(OH)_2 \longrightarrow Ca(OCl)_2.\underset{(Z)}{Ca(OH)_2}.CaCl_2.2H_2O$

Z is bleaching powder it turns red litmus paper to white.

3. (B) $H_2SO_4 + PbO_2 \longrightarrow PbSO_4\downarrow + \frac{1}{2}O_2 + H_2O$ (PbO_2 is not peroxy compound) (PbO_2 परॉक्सी यौगिक नहीं है)

$H_2SO_4 + BaO_2 \longrightarrow BaSO_4\downarrow + H_2O_2$



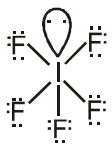
$(NH_4)_2SO_4 \rightleftharpoons 2NH_4^+ + SO_4^{2-}$; At anode : $2SO_4^{2-} \xrightarrow{\text{Electrolysis}} S_2O_8^{2-} + 2e^-$

Peroxo sulphate on hydrolysis, produces H_2O_2.

4. $\underset{(A)}{IF_5} + H_2O \longrightarrow \underset{(P)}{HF} \longrightarrow + \underset{(Q)}{HIO_3}$

HF is used in etching of glass

$\underset{(Q)}{HIO_3} \underset{\text{heating}}{\overset{\text{on strong}}{\rightleftharpoons}} \underset{(R)}{I_2O_5}$



$\underset{(R)}{I_2O_5} + CO \longrightarrow I_2 + CO_2$

5. (D) Aqueous solution of SO_2 acts as a reducing agent

$SO_2 + 2H_2O \longrightarrow H_2SO_4 + \underset{\text{nascent hydrogen}}{2H}$

Thus, SO_2 in presence of moisture is used as bleaching agent. This is due to the reducing nature of SO_2.

For delicate articles

Coloured matter + H $\longrightarrow$ Colourless matter

Similarly, Cl_2 acts as bleaching agent in presence of moisture

$Cl_2 + H_2O \longrightarrow 2HCl + [O]$

Coloured matter + [O] $\longrightarrow$ Colourless matter

6. (b) $XeF_4 + SbF_5 \longrightarrow [XeF_3]^+ [SbF_6]^- \longrightarrow$ $[XeF_3]^+$ (+) $[SbF_6]^-$

$sp^3 d$ — bent T-shape; $sp^3 d^2$ — octahedral

9. (B) $6Cl_2 + 2Ba(OH)_2 \longrightarrow \underset{(X)}{Ba(ClO_3)_2} + 5BaCl_2 + 6H_2O$

$Ba(ClO_3)_2 + H_2SO_4 \longrightarrow \underset{(Y)}{2HClO_3} + BaSO_4 \downarrow$

$2HClO_3 \xrightarrow[\Delta > 365\ K]{\Delta} 2ClO_2 + H_2O + \frac{1}{2} O_2$

11. (I) Ni (impure) $+ 4CO \xrightarrow{50°C} [Ni(CO)_4]$ (volatile) $\xrightarrow{230°C} Ni$ (pure) $+ 4CO \uparrow$

(II) $Cu_2S + \frac{3}{2}O_2 \xrightarrow{\Delta} Cu_2O + SO_2$

$Cu_2S + 2Cu_2O \xrightarrow[\text{temp.}]{\text{high}} 6Cu + SO_2$

(III) $MgCl_2\,(s) \xrightarrow{\text{electrolysis}} Mg^{2+}(\ell) + 2Cl^-(\ell)$

At Cathode : $Mg^{2+} + 2e^- \longrightarrow Mg$; At anode : $2Cl^-(\ell) \longrightarrow Cl_2(g) + 2e^-$

12. (i) $Cr_2O_3 + 2Al\ (R.A.) \xrightarrow{\Delta} Al_2O_3 + 2Cr$; ΔH = –ve

(ii) Mg is extracted by electrolysis of fused $MgCl_2$ and NaCl.

(iii) $PbS + \frac{3}{2}O_2 \longrightarrow PbO + SO_2$; $PbO + C \longrightarrow Pb + CO$

(iv) Red Bauxite is purified by Baeyer's process.

13. $MgCl_2 + Na_2CO_3 \rightarrow MgCO_3 + NaCl$

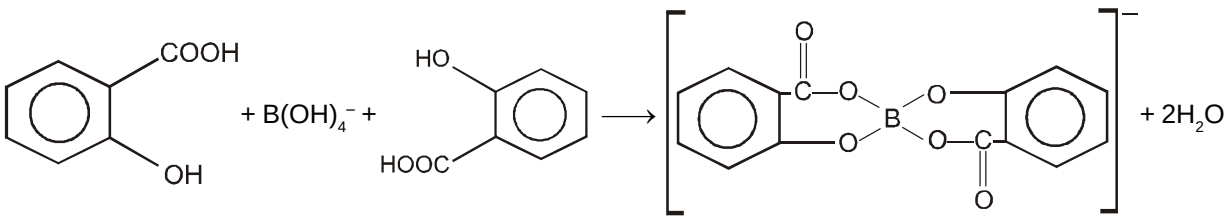
$Ca(HCO_3)_2 + Na_2CO_3 \rightarrow CaCO_3 + 2NaHCO_3$

$H_2SO_4 + Na_2CO_3 \rightarrow Na_2SO_4 + H_2O + CO_2$

$Na_2CO_3 + H_2O + CO_2 \rightarrow 2NaHCO_3$

14. For $2C(s) + O_2(g) \rightarrow 2CO(g)$ ΔS = +ve, slope is –ve

15. $Na_2B_4O_7.10H_2O + aq \rightleftharpoons 4H_3BO_3 + 2NaOH$; $H_3BO_3 + OH^- \rightleftharpoons B(OH)_4^-$



⟶ Optically resolvable due to asymmetric structure

⟶ Two six membered rings.

16. $NH_3(excess) + Cl_2 \longrightarrow NH_4Cl + N_2$

$NH_3 + Cl_2(excess) \longrightarrow NCl_3 + HCl$

17. $SO_2 + PCl_5 \longrightarrow SOCl_2 + POCl_3$

No change in oxidation number of any element. So, not a redox reaction.

$SOCl_2$ is thionylchloride; SO_2Cl_2 is sulphuryl chloride.

$POCl_3 + H_2O \longrightarrow H_3PO_4 + HCl$ } strongly acidic solutions

$SOCl_2 + H_2O \longrightarrow H_2SO_3 + HCl$

$\downarrow$

SO_2

Both the products have sp^3 hybridisation of central atom.

20. $2Al + 2NaOH + 2H_2O \longrightarrow 2NaAlO_2 + 3H_2\uparrow$

$Zn + 2NaOH \longrightarrow \underset{\text{sod. zincate}}{Na_2ZnO_2} + H_2\uparrow$

$4S + 6NaOH \longrightarrow 2Na_2S + Na_2S_2O_3 + 3H_2O$

$P_4 + 3NaOH + 3H_2O \longrightarrow \underset{\text{sod. hypophosphite}}{3NaH_2PO_2} + PH_3\uparrow$

$Cl_2 + 2NaOH \longrightarrow NaClO + H_2O$

24. $P_2O_3 \xrightarrow[\text{cold}]{H_2O} H_3PO_3 \xrightarrow[\text{heating}]{\text{on}} PH_3\uparrow + H_3PO_4$

(A) (C) (D)

$H_3PO_4 \xrightarrow{220^\circ C} H_4P_2O_7 \xrightarrow{320^\circ C} HPO_3 \xrightarrow[\text{strong heating}]{\text{further}} P_2O_5$

25. $BeCl_2 + 2H_2O \longrightarrow Be(OH)_2 + 2HCl$

$Be(OH)_2 + 2H_2O \underset{}{\overset{\text{alkaline medium}}{\rightleftharpoons}} [Be(OH)_4]^{2-} + 2H^+$

$BeCl_2 + 4H_2O \overset{\text{alkaline medium}}{\rightleftharpoons} [Be(OH)_4]^{2-} + 2HCl + 2H^+$

26. $SF_4 + H_2O \longrightarrow H_2SO_3 + HF$; $TeF_6 + H_2O \longrightarrow Te(OH)_6 + HF$

28. $P + \text{conc. } H_2SO_4 \longrightarrow HCl(g)\uparrow$ (X)

(some chloride)

$HCl(g) + NH_3(g) \longrightarrow NH_4Cl(s)$ (white fumes) ; $P + AgNO_3 \longrightarrow AgCl\downarrow$ (white)

$AgCl + NH_3(aq) \longrightarrow [Ag(NH_3)_2]Cl(aq)$

$HCl + O_2 \xrightarrow{CuCl_2} Cl_2 + H_2O(\ell)$; $H_2O + Cl_2 + Na_2S_2O_3 \longrightarrow NaHSO_4 + NaCl$

31. $Ca_2B_6O_{11} + 2Na_2CO_3 \longrightarrow 2CaCO_3\downarrow + Na_2B_4O_7 + 2NaBO_2$

(Calemanite) (Z)

$Na_2B_4O_7 + H_2SO_4 \longrightarrow H_3BO_3 + Na_2SO_4$

$H_3BO_3 \xrightarrow{\Delta} B_2O_3 + H_2O$

(C)

$B_2O_3 + Mg \longrightarrow MgO + B$

$Cl_2 + B_2O_3 + C \longrightarrow BCl_3 + CO$

(E) (F)

32. Conc.H_2SO_4, anhyd. $CaCl_2$, CaO and P_2O_5

33. By product is $CaCl_2$, x = $CaCO_3$, y = CO_2.

$CaCl_2 + Na_2CO_3 \longrightarrow CaCO_3 + 2NaCl$

34. XeF_2 is a strong oxidising agent with SRP = +2.64.

$XeF_2 + Cl^- \longrightarrow Cl_2 + Xe$

$Br^- \longrightarrow Br_2$

$I^- \longrightarrow I_2$

$XeF_2 + NH_3 \longrightarrow N_2 + NH_4F + Xe$

$XeF_2 + CrF_2 \longrightarrow CrF_3 + Xe$

$Pt + XeF_2 \longrightarrow PtF_6 + Xe$

$S_8 + XeF_2 \longrightarrow SF_6 + Xe$

35. KO_3, RbO_2, Cs_2O_2, BaO_2

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38. $H_2C_2O_4 \xrightarrow{\Delta} H_2O + CO + CO_2$ $\quad$ $H_3PO_2 \xrightarrow{\Delta} H_3PO_4 + PH3$

$H_3PO_3 \xrightarrow{\Delta} H_3PO_4 + PH3$ $\quad$ $HClO \xrightarrow{\Delta} HClO_3 + HCl$

$HNO_2 \xrightarrow{\Delta} HNO_3 + NO + H_2O$ $\quad$ $H_2SO_3 \xrightarrow{\Delta} H_2O + SO_2\uparrow$

$H_2SO_4 \xrightarrow{\Delta}$ No reaction $\quad$ $HClO_3 \xrightarrow{\Delta} HClO_4 + Cl_2\uparrow$

39. Except HCl, HBr, HI, HCN, HF it will react with all other compounds, replacing OH–group by Cl–group.

41. x = Na_2PbO_2 $\quad$ y = Na_2SnO_3 $\quad$ z = $NaAlO_2$

43. (A) $NaNO_3 \xrightarrow{\Delta} NaNO_2 + \frac{1}{2} O_2$

(B) $K + O_2$ (excess) $\longrightarrow KO_2$

(C) $2Na + O_2$ (excess) $\longrightarrow Na_2O_2$

(D) K (dissolved in liquid NH_3) $\longrightarrow$ paramagnetic solution

44. $NH_4ClO_4 \xrightarrow{\Delta} N_2 + Cl_2 + O_2 + H_2O$ $\quad$ $(NH_4)_2CO_3 \xrightarrow{\Delta} NH_3 + CO_2 + H_2O$

$(NH_4)_2Cr_2O_7 \xrightarrow{\Delta} N_2 + Cr_2O_7(s) + H_2O$ $\quad$ $Mg(NH_4)PO_4 \xrightarrow{\Delta} Mg_2P_2O_7 + NH_3 + H_2O$

45. (A) BF_3 can not get oxidised, but being acidic dissolves in KOH, changes color of litmus and is colourless gas.

(B) HCl gets oxidised to Cl_2 by $KMnO_4$ and being acidic, dissolves in aqueous KOH and change color of litmus from blue to red. It is colorless gas.

(C) SO_2 gets oxidised to SO_4^{2-} by $KMnO_4$, and being acidic dissolves significantly in aqueous KOH. It changes color of litmus from blue to red and it is colorless gas.

(D) F_2 does not get oxidised by $KMnO_4$ and dissolves in KOH, to form O_2 and KF. It bleaches litmus solution. It is yellow colour gas.