CHAPTER 6

The p-Block Elements and Their Compounds

EXERCISE # I

❑ **Only one correct answer :**

1. The two main allotropes of tin are :-

(*a*) grey tin, black tin (*b*) white tin, red tin

(*c*) white tin, black tin (*d*) white tin, grey tin

2. The colour of SnS and SnS_2 are respectively :-

(*a*) Black and White

(*b*) Brown and Yellow

(*c*) Black and Colourless

(*d*) Brown and Red

3. Tin particles crumble to powder during severe winters which is said "Tin plague". It is due to :-

(*a*) at low temperature, transformation of white tin into grey tin which is accompanied by volume expansion

(*b*) at low temperature, transformation of grey tin into black tin which is accompanied by volume expansion

(*c*) Consuming grey tin causes disease

(*d*) None

4. SnO is example of amphoteric oxide, supported by which of the following reaction :-

(*a*) $SnO + 2HCl \rightarrow SnCl_2 + H_2O$

(*b*) $SnO + 2NaOH \rightarrow Na_2SnO_2 + H_2O$

(*c*) Both (*a*) & (*b*)

(*d*) $SnO + H_2 \rightarrow Sn + H_2O$

5. Concentrated nitric acid when reacts with tin, a white precipitate is formed. The precipitate is :-

(*a*) H_2SnO_3

(*b*) H_2SnO_2

(*c*) $H_2Sn_5O_{11}.4H_2O$

(*d*) $SnO_2.6H_2O$

6. The correct boiling point order of stannic halides is :-

(*a*) $SnF_4 > SnCl_4 > SnBr_4 > SnI_4$

(*b*) $SnI_4 > SnBr_4 > SnCl_4 > SnF_4$

(*c*) $SnCl_4 > SnI_4 > SnF_4 > SnBr_4$

(*d*) $SnF_4 > SnI_4 > SnBr_4 > SnCl_4$

7. Solution of $SnCl_2$ and $SnCl_4$ can be differentiated by different reagents, because they behave in different way with different reagents. With $HgCl_2$ which of the following option is correct :-

(*a*) $SnCl_2$ react with $HgCl_2$ to give white ppt. of Hg_2Cl_2 which is further reduced by $SnCl_2$ to give black precipitate

(*b*) $SnCl_4$ react with $HgCl_2$ to give white ppt. of Hg_2Cl_2

(*c*) $SnCl_4$ does not react with $HgCl_2$

(*d*) both (*a*) and (*c*) are correct

8. Which of the following statement is correct ?

(*a*) $SnCl_2$ does not react with $FeCl_3$

(*b*) $SnCl_4$ does react with $FeCl_3$ to give $FeCl_6^{2-}$

(*c*) $SnCl_2$ reduces $FeCl_3$ to $FeCl_2$ & then when $K_3[Fe(CN)_6]$ is added, then blue colour is observed.

(*d*) None of these

9. A mass of arborescent crystals (lead tree) slowly deposits when :-

(*a*) Zinc rod is hung in a solution of lead carbonate

(*b*) Iron rod is hung in a solution of lead nitrate

(*c*) Copper rod is hung in a solution of lead acetate

(*d*) Zinc rod is hung in a solution of lead acetate

10. Lead is soluble in :-

(*a*) dilute HCl

(*b*) dilute H_2SO_4

(*c*) cold concentrated HCl

(*d*) warm dilute HNO_3

11. Plumbo solvency - a serious menace where lead piping is used for water supply. It is caused by.

(*a*) Water soluble $PbCO_3$

(*b*) Water insoluble $PbCO_3$

(*c*) Slightly water soluble $Pb(OH)_2$

(*d*) Water soluble $Pb(OH)_2.PbCO_3$

12. Pb_3O_4 when reacts with HCl, the products formed are :-

(*a*) $PbCl_2$, H_2O , Cl_2

(*b*) $PbCl_2$, H_2O

(*c*) $PbCl_2$, H_2O , Cl_2 , O_2

(*d*) PbO_2 , Cl_2 , H_2O

13. Pb_3O_4 when reacts with HNO_3, the products formed are :-

(*a*) $Pb(NO_3)_2$, H_2O , NO_2

(*b*) $Pb(NO_3)_2$, H_2O

(*c*) $Pb(NO_3)_2$, O_2 , H_2O

(*d*) $Pb(NO_3)_2$, PbO_2 , H_2O

14. TEL (tetraethyl lead) is a colourless liquid which has boiling point 82°C. It is prepared by action of :-

(*a*) ethyl alcohol with lead chloride

(*b*) ethyl chloride vapour on sodilum lead alloy

(*c*) ethyl ether vapour with lead metal

(*d*) ethyl benzene with lead chloride

15. The correct melting point order of plumbous halide:-

(*a*) $PbF_2 > PbCl_2 > PbI_2 > PbBr_2$

(*b*) $PbI_2 > PbBr_2 > PbCl_2 > PbF_2$

(*c*) $PbCl_2 > PbF_2 > PbBr_2 > PbI_2$

(*d*) $PbF_2 < PbCl_2 < PbBr_2 < PbI_2$

16. $\begin{matrix} CH_3CH–OH \\ | \\ CH_3CH–OH \end{matrix} \xrightarrow[\text{lead tetraacetate}]{} H_2O + \text{Product(P).}$

P is:-

(*a*) CH_3CO_2H

(*b*) $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$

(*c*) $CH_3 - CH = O$

(*d*) $CH_3-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-H_3C$

17. H_2O_2 converts black precipitate PbS into :-

(*a*) Elemental Pb

(*b*) Red colour Pb_3O_4

(*c*) Grey colour PbO

(*d*) White coloured precipitate $PbSO_4$

18. The colour of PbO_2 (lead dioxide) :-

(*a*) Yellow (*b*) Scarlet red

(*c*) Chocolate brown (*d*) Black

19. The colour of Pb_3O_4 :-

(*a*) Yellow (*b*) Scarlet red

(*c*) Chocolate brown (*d*) Black

20. When lead is heated in air, a yellow powder A is formed. When A is fused, cooled and powdered, a reddish yellow crystalline varity B is formed, A and B are respectivley :-

(*a*) Massicot & Litharge

(*b*) Red lead & lead dioxide

(*c*) Litharge & Massicot

(*d*) Lead dioxide & Red lead

21. When litharge is calcinated for about 48 hrs in a current of air at a temperature almost equal to 340°C, then the product formed is :-

(*a*) PbO_2 (*b*) Pb_2O_3

(*c*) Pb_3O_4 (*d*) PbO

22. The correct formula of white lead which is used as pigment is :-

(*a*) $PbCO_3.Pb(OH)_2$ (*b*) $PbCO_3.2Pb(OH)_2$

(*c*) $2PbCO_3.Pb(OH)_2$ (*d*) $3PbCO_3.Pb(OH)_2$

23. Lithium aluminium hydride when reacts with stannic chloride in ether medium at very low temperature, the product formed :-

(*a*) Sn_2H_6 (*b*) SnH_2

(*c*) SnH_4 (*d*) Sn_3H_8

24. PbO_2 (Pb in +4 oxidation state) oxidises $MnSO_4$ solution in acidic medium into :-

(*a*) pink solution of $HMnO_4$

(*b*) black MnO_2 ppt.

(*c*) reddish brown solution of $MnO(OH)_2$

(*d*) Mn_3O_8

25. $Na_2[SnO_2]$ (Sn in +2 oxidation state) reduces $Bi(NO_3)_3$ into :-

(*a*) Black colour precipitate of Bi

(*b*) Red colour precipitate of Bi

(*c*) Brown colour precipitate of Bi

(*d*) None of these

26. The lewis acidic strength order among bromo halides :-

(*a*) $BF_3 > BCl_3 > BBr_3 > BI_3$

(*b*) $BI_3 > BBr_3 > BCl_3 > BF_3$

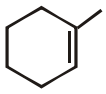
(*c*) $BBr_3 > BCl_3 > BF_3 > BI_3$

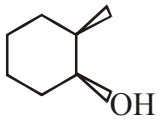
(*d*) $BF_3 > BI_3 > BBr_3 > BCl_3$

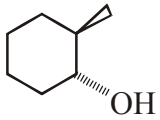
27. Orthoborates are :-

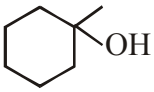
(*a*) planar unit (*b*) pyramidal unit

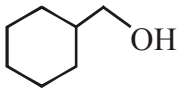
(*c*) tetrahedral unit (*d*) angular unit

28.  $\xrightarrow[H_2O_2+OH^-]{B_2H_6(THF)}$ Product(P). P is

(*a*) 

(*b*) 

(*c*) 

(*d*) 

29. Which of the following reaction, product are correctly predicted :-

(*a*) $B_3N_3H_6 + HCl \longrightarrow (XS)$

(*b*) $B_3N_3H_3Cl_3 + NaBH_4 \longrightarrow B_3N_3H_6 + NaCl + B_2H_6$

(*c*) $B_3N_3H_6 + 9H_2O \longrightarrow H_3BO_3 + NH_3 + H_2$

(*d*) All

30. The oxidation stae of B, N in $B_3N_3H_6$ are respectively :-

(*a*) +3, –3 (*b*) +1, –1

(*c*) –3, +3 (*d*) –1, +1

31. B_2H_6 can not be methylated beyond :-

(*a*) $Me_2B_2H_4$

(*b*) $Me_3B_2H_3$

(*c*) $Me_4B_2H_2$

(*d*) Me_5B_2H

32. Anhydrous aluminium chloride is obtained by :-

(*a*) strongly heating to 1000°C a mixture of alumina and coke in a current of chlorine

(*b*) by passing dry chlorine or hydrogen chloride over heated aluminium turnings

(*c*) both (*a*) & (*b*)

(*d*) None

33. Zinc and copper reacts with concentrated nitric acid to given

(*a*) NO_2 (*b*) NO

(*c*) N_2O (*d*) N_2

34. B_2H_6 is :-

(*a*) electron rich molecule and paramagnetic

(*b*) electron rich molecule and paramagnetic

(*c*) electron defficient molecule and paramagnetic

(*d*) electron defficient molecule and diamagnetic

35. Zinc reacts with dilute nitric acid to give

(*a*) NO_2 (*b*) NO

(*c*) N_2O (*d*) N_2

36. Aluminium triethyl in conjuction with titanium chloride $TiCl_4$ is called:-

(*a*) Al-titanium alloy (*b*) Alum

(*c*) Goldsmith mixture (*d*) Zeigler natta catalyst

37. Copper reacts with dilute nitric acid to give

(*a*) NO_2 (*b*) NO

(*c*) N_2O (*d*) N_2

38. Alums containing thallium one of the types :-

(*a*) $K_2SO_4.Tl(SO_4)_3.24H_2O$

(*b*) $Tl_2SO_4.Al_2(SO_4)_3.24H_2O$

(*c*) $K_2SO_4.Al_2(SO_4)_3.24H_2O$

(*d*) $Tl(SO_4).K_2SO_4.24H_2O$

39. A silvery white metal liquefies on a hot summer day but is solid an cold days. It is readily attacked by dilute acid liberating hydrogen. A is :-

(*a*) B (*b*) Ag

(*c*) Al (*d*) Mg

40. Which of the following is orange coloured solid :-

(*a*) CCl_4 (*b*) $SiBr_4$

(*c*) SnI_4 (*d*) $SbCl_3$

41. A gas at low temperature does not react of the compounds. It is inert in nature. The combustion of this gas is exceptionally an endothermic reaction. The gas is :-

(*a*) O_2 (*b*) N_2

(*c*) CO (*d*) H_2

42. An explosive compound (*a*) when reacts with water, it give NH_4OH and HCl. A is :-

(*a*) TNG (*b*) TNT

(*c*) NCl_3 (*d*) HNO_3

43. Three allotropes A , B and C of phosphorus are transfered into each other in the following reaction :-

$$A \xrightarrow[1200atm]{470K} B \xrightarrow[CO_2atm]{570K} C$$

(*a*) white, black, red (*b*) black, white, red

(*c*) red, black, white (*d*) red, white, black

44. Which is incorrectly matched :-

(*a*) $CsBr_3 \rightleftharpoons Cs^+ + Br_3^-$

(*b*) $AgBrO_3 \rightleftharpoons Ag^+ + BrO_3^-$

(*c*) $I_4O_9 \rightleftharpoons I^{3+} + (IO_3^-)_3$

(*d*) $I_2O_4 \rightleftharpoons IO_2^- + IO_2^+$

45. Copper reacts with concentrated nitric acid to give

(*a*) NO_2 (*b*) NO

(*c*) N_2O (*d*) N_2

46. $C(OH)_4$ is unstable but $Si(OH)_4$ is a stable compound because :-

(*a*) C = O bond energy is very low

(*b*) C = O bond energy is very high

(*c*) Si = O bond energy is very high

(*d*) All of these

47. When a salt X reacts with ozone in aqueous medium, a compound Y is produced ozone also reacts with Y and produces compound Z. Z acts as an oxidising reagent.Then X,Y, Z can be :-

(*a*) X = HI ; Y = I_2 ; Z = HIO_3

(*b*) X = KI ; Y = I_2 ; Z = HIO_3

(*c*) X = KI ; Y = I_2 ; Z = HOI

(*d*) X = KI ; Y = I_2 ; Z = HIO_4

48. A gas exists in three allotropic forms α, β, γ is:-

(*a*) SO_2 (*b*) SO_3

(*c*) CO_2 (*d*) NH_3

49. $KOCN + (NH_4)_2SO_4 \xrightarrow{\Delta}$

In the following reaction one of the product is :-

(*a*) NH_4NO_2 (*b*) NH_4NO_3

(*c*) NH_2CONH_2 (*d*) both N_2 & O_2

50. Which element become passive due to protective layer of oxide formation, when reacts with concentrated nitric acid

(*a*) Fe (*b*) Cr

(*c*) Al (*d*) all of these

51. The ratio of 2C–2e and 3C–2e bonds in diborane is :-

(*a*) 0 (*b*) 1

(*c*) 2 (*d*) 3

52. Sulphur dioxide reacts with hydrogen sulphide to give sulphur precipitate. Here SO_2 and H_2S acts as:-

(*a*) oxidising and reducing reagent respectively

(*b*) reducing and oxidising reagent respectively

(*c*) base and acid respectively

(*d*) acid and base respectively

53. SO_2 and Cl_2 bleaches coloured substance :-

(*a*) by reduction and oxidation respectively

(*b*) by reduction and reduction respectively

(*c*) by oxidation and reduction respectively

(*d*) by oxidation and oxidation respectively

54. Zeolite which is hydrated sodium aluminium silicate is used as water softner because :-

(*a*) the potassium ions of zeolite are exchanged with barium and strontium ions when hard water is passed through it

(*b*) the sodium ion of zeolite are exchanged with barium and strontium ions when hard water is passed through it

(*c*) the potassium ions of zeolite are exchanged with barium and strontium ions when hard water is passed through it

(*d*) the sodium ions of zeolite are exchanged with calcium and magnesium ions when hard water is passed through it

55. Sulphur dioxide acts as more powerful reducing agent in :-

(*a*) acidic medium (*b*) neutral medium

(*c*) alkaline medium (*d*) None

56. The number of moles of H_2O_2 required to convert 1 mole of PbS into $PbSO_4$.

(*a*) 1 (*b*) 2

(*c*) 3 (*d*) 4

57. Metal (M) $\xrightarrow{+N_2\,gas}$ Solids(S)

$S + H_2O \longrightarrow G(gas)$

$G + CuSO_4$ solution $\longrightarrow$ Blue colour solution(X)

Blue colour solution is :-

(*a*) $[Cu(NH_3)_6]SO_4$ (*b*) $[Cu(NH_3)_4]SO_4$

(*c*) $[Cu(NH_3)_2]SO_4$ (*d*) $[Cu(NO_3)_4]SO_4$

58. $Xe + F_2 \longrightarrow P_1 Xe + F_2 \longrightarrow P_2 Xe + F_2 \longrightarrow P_3$

(2:1 volume ratio)(1:5 volume ratio)(1:20 volume ratio)

P_1, P_2, P_3 are respectively :-

(*a*) XeF_2, XeF_4, XeF_6 (*b*) XeF_2, XeF_6, XeF_4

(*c*) XeF_6, XeF_4, XeF_2 (*d*) XeF_4, XeF_2, XeF_6

59. XeO_3 in strong alkaline medium (above pH 10.5) forms :-

(*a*) $HXeO_4^-$ (perxenate ion)

(*b*) XeO_6^{4-} (xenate ion)

(*c*) $HXeO_4^-$ (xenate ion)

(*d*) XeO_6^{4-} (perxenate ion)

60. Among all noble gases, only Xe reacts with F_2 to give many Xenon fluoride because Xenon :-

(*a*) has largest size among all noble gases

(*b*) has the lowest ionisation enthalpy among all noble gases

(*c*) has highest heat of vaporisation among all noble gases

(*d*) is the most readily available among all noble gases

61. ClO_3 is the mixed anhydride of :-

(*a*) $HClO_2$ and $HClO_3$ (*b*) $HClO_2$ and $HClO_4$

(*c*) HOCl and $HClO_3$ (*d*) $HClO_3$ and $HClO_4$

62. Among F^-, Cl^-, Br^-, I^- :-

(*a*) I^- is the least stable base

(*b*) I^- is the weakest reducing reagent

(*c*) I^- is the most basic

(*d*) I^- is the strongest reducing reagent

63. Which of the following product is formed when sulphur dioxide gas is passed through sodium chlorate in strongly acidic solution :-

(*a*) $NaClO_4$ (*b*) ClO_2

(*c*) $NaSO_3$ (*d*) SO_3

64. The oxide of chlorine which has odd number electrons and paramagnetic in nature is :-

(*a*) Cl_2O_7 (*b*) Cl_2O

(*c*) ClO_2 (*d*) Cl_2O_6

65. The colour of vapour obtained when an iodide salt is heated with concentrated H_2SO_4 is :-

(*a*) pale yellow (*b*) violet

(*c*) reddish brown (*d*) greenish yellow

66. HI can be prepared by which of the following methods :-

(*a*) $PI_3 + H_2O \longrightarrow$ (*b*) $H_2 + I_2 \xrightarrow{Pt}$

(*c*) $KI + H_2SO_4 \longrightarrow$ (*d*) $I_2 + H_2S \longrightarrow$

67. What is the maximum coordination number of iodine in the mixture of IF_7 and CsF :

(*a*) 2 (*b*) 4

(*c*) 6 (*d*) 8

68. For which halogen, reaction with water will be most exothermic :-

(*a*) Fluorine (*b*) Chlorine

(*c*) Bromine (*d*) Iodine

69. A greenish yellow gas reacts with KOH to give potassium halide which can be used in fire works and safety matches. The gas and half Fe respectively are :-

(*a*) Br_2 ; $KBrO_3$ (*b*) Cl_2 ; $KClO_3$

(*c*) I_2 ; $NaIO_3$ (*d*) None

70. How many statements are correct regarding neon:-

(*a*) Neon is diatomic in nature

(*b*) Neon does not form clathrate with quinol

(*c*) Neon lights are visible even in fog and moist

(*d*) All of these

71. XeF_6 when reacts with cesium fluoride it acts as:-

(*a*) Bronsted acid (*b*) Bronsted base

(*c*) Lewis acid (*d*) Lewis base

72. A black solid X reacts with NH_3 to form a mild explosive which decomposes to give violet coloured gas. X also reacts with H_2 to give an acid Y. Y can also be prepared by heating its salt with H_2PO_4. X and Y are :-

(*a*) Cl_2, HCl (*b*) F_2, HF

(*c*) Br_2, HBr (*d*) I_2, KI

73. Fluorine is obtained by the interaction of K_2MnF_6 with Lewis acid SbF_5 because :-

(*a*) In the first step, K_2MnF_6 is converted into MnF_4

(*b*) In the second step, MnF_4 is dissociated into MnF_2 and F_2

(*c*) Both (*a*) & (*b*)

(*d*) None of these

74. Which of the following product is formed when one mole periodate ion (IO_4^-) reacts with excess of iodide ions followed by the acidification of solution ?

(*a*) IO^- (*b*) IO_3^-

(*c*) I_2 (*d*) I_2O_5

75. Which of the following options is incorrect ?

(*a*) Sodium hypochlorite is used as bleaching and sterilising agent.

(*b*) All halogens except F_2 are more reactive than interhalogens.

(*c*) Finely divided iron can not form ferric chloride with hydrochloric acid.

(*d*) HNO_3 oxidises sulphur to H_2SO_4 but only oxidises selenium to H_2SeO_3.

76. Ester of boric acid $B(OC_2H_5)_3$ imparts :-

(*a*) Blue colour to the burner flame

(*b*) Green colour to the burner flame

(*c*) Red colour to the burner flame

(*d*) Brown colour to the burner flame

77. The repeating structural units in silicone is :-

(*a*) $R_2SiO–$ (*b*) SiO_2

(*c*) ROSiOR (*d*) $–SiR_2OOR$

78. A given silicate is amphibole :

$Na_2\overset{II}{Fe}_x\ \overset{III}{Fe}_y\ [Si_8O_{22}](OH)_2$

The value of x + y is

(*a*) 5 (*b*) 7

(*c*) 3 (*d*) 9

79. On contact process, one of the step is

$2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$

This reaction is carried out :-

(*a*) at 500 K and 9 bar pressure with Pt/Rh as catalyst

(*b*) at 1200 K and 5 bar pressure with Pt/Rh as catalyst

(*c*) at 500 K and 7 bar pressure with V_2O_5 as catalyst

(*d*) at 720 K and 2 bar pressure with V_2O_5 as catalyst

80. In ostwald's process , one of the step is

$4NH_3(g) + 5O_2(g) \longrightarrow 4NO(g) + 6H_2O(g)$

This reaction is carried out :-

(*a*) at 500 K and 9 bar pressure with Pt/Rh as catalyst

(*b*) at 1200 K and 5 bar pressure with Pt/Rh as catalyst

(*c*) at 500 K and 7 bar pressure with V_2O_5 as catalyst

(*d*) at 720 K and 2 bar pressure with V_2O_5 as catalyst

81. $2MX + H_2SO_4 \longrightarrow 2HX + M_2SO_4$

MX can be :-

(*a*) MI (*b*) MCl

(*c*) MBr (*d*) MI

82. In a mixture of HNO_3 and H_2SO_4, HNO_3 acts as:-

(*a*) base (*b*) acid

(*c*) oxidising reagent (*d*) reducing agent

83. $Br_2 + 2X^-(aq) \longrightarrow X_2 + 2Br^-(aq)$

above reacation is correct when X^- is :-

(*a*) F^-, Cl^- (*b*) I^- only

(*c*) F^-, Cl^-, I^- (*d*) Cl^-, I^-

84. Which acid on heating produces phosphoric acid by disproportionation reaction ?

(*a*) Phosphoric acid H_3PO_4

(*b*) Phosphorus acid H_3PO_3

(*c*) Peroxy monophosphoric acid

(*d*) Metaphosphoric acid

85. In copper sulphate pentahydrate how many anion water is present.

(*a*) 0 (*b*) 1

(*c*) 2 (*d*) 3

86. Temporary hardness of water is caused by presence of

(*a*) Soulble nitrate

(*b*) Soulble nitrite

(*c*) Insoulble carbonate

(*d*) Soulble bicarbonate of Ca and Mg

87. The method which is not applicable for manufacturing ammonia?

(*a*) $NH_2-\underset{\underset{O}{\|}}{C}-NH_2 + H_2O \longrightarrow$

(*b*) $NH_4Cl + Ca(OH)_2 \longrightarrow$

(*c*) $ZnSO_4 + NH_4OH \longrightarrow$

(*d*) $(NH_4)_2SO_4 + NaOH \longrightarrow$

88. $\underset{\text{(Colourless solid)}}{X} \xrightarrow{NaOH/\Delta} Y \xrightarrow{HCl}$ White fume

$X \xrightarrow{CaCl_2} \underset{\text{(White ppt.)}}{Z}$ $Z \xrightarrow{KMnO_4}$ Colourless solution

Salt X is :-

(*a*) BaC_2O_4 (*b*) $(NH_4)_2CO_3$

(*c*) CaC_2O_n (*d*) $(NH_4)_2C_2O_4$

89. Ammonia can be dried by :-

(*a*) concentrated H_2SO_4

(*b*) P_4O_{10}

(*c*) CaO

(*d*) anhydrous $CaCl_2$

90. HNO_3 when reacts with P_4O_{10} it gives :-

(*a*) NO_2 (*b*) N_2O_3

(*c*) N_2O_4 (*d*) N_2O_5

91. H_2O_2 is not an example of :-

(*a*) reducing reagent (*b*) oxidising reagent

(*c*) dehydrating reagent (*d*) Bleaching reagent

92. H_2O_2 when reacts with KIO_4 and NH_2OH respectively, it acts as :-

(*a*) reducing reagent & oxidising reagent

(*b*) reducing reagent & reducing reagent

(*c*) oxidising reagent & oxidising reagent

(*d*) oxidising reagent & reducing reagent

93. When titanium oxide reacts with H_2O_2 , it gives :-

(*a*) red colour due to formation of titanium oxide

(*b*) yellow orange colour due to formation of titanium oxide/ titanium sulphate

(*c*) black colour due to formation of titanium oxide

(*d*) violet colour due to formation of titanium oxide

94. Chemical reagent added to remove temporary hardness of water is -

(*a*) Na_2CO_3 (*b*) $Ca(OH)_2$

(*c*) $MgSO_4$ (*d*) $CaSO_4$

95. Ozonolysis is a reaction when O_3 gas is passed through :-

(*a*) saturated hydrocarbon

(*b*) unsaturated hydrocarbon

(*c*) cyclohexane ring

(*d*) cyclopentane ring

96. Ozone oxidises moist sulphur to :-

(*a*) SO_2 (*b*) SO_3

(*c*) H_2SO_4 (*d*) H_2SO_3

97. On heating ozone, its volume :-

(*a*) decreases to half

(*b*) becomes double

(*c*) increases to 3/2 times

(*d*) remain unchanged

98. The laboratory test "trailing of mercury" is applicable to identify :-

(*a*) O_2 (*b*) H_2O

(*c*) H_2O_2 (*d*) O_3

99. Which is responsible for depleting ozone layer which protects from ultraviolet light ?

(*a*) Chloroform

(*b*) Chlorofluoro carbon

(*c*) Carbon tetrachloride

(*d*) Methyl chloride

100. Aqueous solution of bleaching powder is source of :-

(*a*) $O_2 + Cl^-$ (*b*) $OH^- + Cl_2$

(*c*) $OH^- + Cl^-$ (*d*) $O_3 + Cl^-$

101. $CH_3COCH_3 \xrightarrow[\text{aqueous solution}]{Ca(OCl)Cl} CHCl_3 + \text{Product}$ (P). P is :-

(*a*) CH_3CH_3 (*b*) $CH_3CHOHCH_3$

(*c*) $(CH_3CO_2)_2Ca$ (*d*) $(HCO_2)_2Ca$

102. The incorrect statements are :-

(*a*) Bleaching powder is strong oxidising reagent due to evolution of nascent oxygen.

(*b*) Bleaching powder is strong oxidising reagent due to evolution of nascent chlorine.

(*c*) Bleaching powder reacts with methanol to give calcium formate

(*d*) Bleaching powder oxidises NH_3 into NCl_3

103. A pale yellow solid (A) having crown shape is heated with concentrated H_2SO_4 , it gives suffocating smell of gas B, which is passed through moistened with starch iodide paper and turn it into blue. The gas B and solid A are respectively.

(*a*) SO_3 & S_8 (*b*) SO_2 & S_8

(*c*) SO_2 & S_2N_2 (*d*) SO_3 & SO_2

104. H_2O_2 acts as oxidising reagent when it reacts with:-

(*a*) Potassium ferrocyanide in acidic medium

(*b*) Potassium ferrocyanide in basic medium

(*c*) Potassium ferricyanide in acidic medium

(*d*) Potassium ferricyanide in basic medium

105. H_2O_2 acts as reducing reagent when it reacts with:-

(*a*) Potassium ferrocyanide in acidic medium

(*b*) Potassium ferrocyanide in basic medium

(*c*) Potassium ferricyanide in acidic medium

(*d*) Potassium ferricyanide in basic medium.

106. Ca(OCl)Cl when reacts with $FeSO_4$ solution, Ca(OCl)Cl is converted into :-

(*a*) Cl_2 (*b*) $CaCl_2$

(*c*) $Ca(OCl)_2$ (*d*) $Ca(OH)_2$

107. Calgon is used for water treatment. Calgon is:-

(*a*) $Na_2[Na_4(PO_3)_6]$ (*b*) $Na_4[Ca(PO_3)_6]$

(*c*) $Na_2[Ca_2(PO_3)_6]$ (*d*) $Na_4[Na_2(PO_3)_6]$

108. O-O bond length :-

(*a*) $O_2 < O_3 < H_2O_2$ (*b*) $O_3 < O_2 < H_2O_2$

(*c*) $H_2O_2 < O_3 < O_2$ (*d*) $O_2 < H_2O_2 < O_3$

109. The permutit process is based on

(*a*) exchange of basic radical or metal ion. e.g. Ca^{2+} and Mg^{2+} by Na^+

(*b*) exchange of acidic radical like HCO_3^- / CO_3^{2-} by SO_4^{2-}, NO_3^-

(*c*) exchange of both acidic and basic radical

(*d*) None

110. Pair of metals does not dissolve in nitric acid :-

(*a*) Cr, Al (*b*) Ag, Au

(*c*) Al, Ag (*d*) Pt, Hg

111. Ammonia on reaction with sodium hypochlorite gives :-

(*a*) NO (*b*) NH_4Cl

(*c*) $NH_2–NH_2$ (*d*) HNO_2

112. $NH_4Cl(s)$ is heated in test tube. Vapours are brought in contact with red litmus paper, which changes to blue and then red. It is because of :-

(*a*) formation of NH_4OH and HCl

(*b*) formation of NH_3 and HOCl

(*c*) greater diffusion of NH_3 than HCl

(*d*) greater diffusion of HCl from NH_3

113. Which of the following gives mixture of SO_2 and SO_3 on heating :-

(*a*) $ZnSO_4$ (*b*) $CuSO_4$

(*c*) $Fe(SO_4)_3$ (*d*) $FeSO_4$

114. ZSM–5–A type of zeolite is used :-

(*a*) to convert starch into alcohol

(*b*) to convert alcohols into gasoline

(*c*) to convert petroleum products into branched hydrocarbon

(*d*) to convert hydrocarbon into alcohol

115. In alumino silicates

(*a*) Aluminium atom replaces few silicon atoms in three dimensional network of silicon dioxide

(*b*) Silicon atoms replaces few aluminium atom in three dimensional network of silicon dioxide

(*c*) Aluminium atom replaces few silicon atoms in three dimensional network of alumina

(*d*) Silicon atoms replaces few aluminium atom in three dimensional network of alumina

116. Concentrated HNO_3 reacts with iodine to give :-

(*a*) HI (*b*) HOI

(*c*) HIO_4 (*d*) HIO_3

117. Blood pH is maintained between 7.26 to 7.42. It is due to -

(*a*) H_2SO_3 / HSO_3^- buffer system

(*b*) H_2SO_4 / HSO_4^- buffer system

(*c*) H_2CO_3 / HCO_3^- buffer system

(*d*) HF / F^- buffer system

118. $2E(s) + N_2(g) \xrightarrow{\Delta} 2EN(s)$

$2E(s) + 3X_2(g) \xrightarrow{\Delta} 2EX_3(s)$

E belongs to :-

(*a*) Group 13 element (*b*) Group 14 element

(*c*) Group 15 element (*d*) Group 16 element

119. $S_2O_3^{2-} + Pb^{2+} \longrightarrow PbS_2O_3$ (Precipitate P_1)

$PbS_2O_3 + H_2O \longrightarrow 2H^+ + SO_4^{2-} + PbS$ (Precipitate P_2)

$PbS + H_2O_2 \longrightarrow H_2O + PbSO_4$ (Precipitate P_3)

Correct option -

(*a*) P_1 is black colour precipitate

(*b*) P_2 is white colour precipitate

(*c*) Precipitate P_1 is soluble in excess thiosulphate

(*d*) P_3 is black colour precipitate

120. Strongest acid is

(*a*) HI (*b*) HBr

(*c*) HCl (*d*) $HF + SbF_5$

121. The least atomic radius is observed in

(*a*) Al (*b*) Ga

(*c*) In (*d*) Tl

122. The highest electronegativity is observed in

(*a*) Al (*b*) Ga

(*c*) In (*d*) Tl

123. The highest and least oxidation state of element in group 16 will be -

(*a*) +6, +2 (*b*) +4, –2

(*c*) +5, –3 (*d*) +6, –2

124. A certain salt X, gives the following results

(*i*) Its aqueous solution is alkaline to litmus

(*ii*) It swells up to a glassy mateiral Y on strong heating

(*iii*) When concentrated H_2SO_4 is added to a hot solution od X, white crystal of an acid Z separates out.

X is -

(*a*) $Na_2B_4O_7$ (*b*) $Ca_2B_6O_{11}$

(*c*) $B_2O_3.TiO_2$ (*d*) $NaBH_4$

125. Z is

(*a*) HBO_2 (*b*) H_3BO_3

(*c*) $H_4B_2O_7$ (*d*) None

126. When metal X is treated with sodium hydroxide, a white precipitate (*a*) is obtained, which is soluble in excess of NaOH to give soluble complex (*b*). Compound (*a*) is soluble in dilute HCl to form compound (*c*). The compound (*a*) when heated strongly gives (*d*) , which is used to extract metal. X is :-

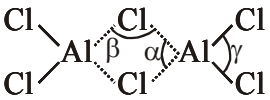
(*a*) B (*b*) Al

(*c*) Tl (*d*) Zn

127. B and D are respectively -

(*a*) $Tl(OH)_2$; Tl_2O (*b*) $Zn(OH)_2$; ZnO

(*c*) $Al(OH)_3$; Al_2O_3 (*d*) $B(OH)_3$; B_2O_3

128. 

(*a*) $\alpha > \beta > \gamma$

(*b*) $\beta > \gamma > \alpha$

(*c*) $\beta > \alpha > \gamma$

(*d*) $\gamma > \beta > \alpha$

129. In alum like $M^IM^{III}(SO_4)_2.12H_2O$:-

(*a*) Six water molecule are octahedrally coordinated around M^I

(*b*) Six water molecule are octahedrally coordinated around M^{III}

(*c*) These water molecule are characterised as lattice water

(*d*) All

130. $BF_3 + 3LiAlH_4 \longrightarrow 2B_2H_6 + 3LiF + 3AlF_3$

Correct option for this reaction :-

(*a*) This reaction is example of redox reaction where $LiAlH_4$ acts as reducing agent.

(*b*) This reaction is example of redox reaction where BF_3 acts as reducing agent.

(*c*) This reaction is example of non redox reaction

(*d*) Oxidation state of hydrogen atom in reactant side is different w.r.t. oxidation state of hydrogen atom in product side.

131. $NH_3 \rightarrow N_2$, This conversion is carried out in presence of -

(*a*) Bleaching powder (*b*) CuO

(*c*) Both (*a*) and (*b*) (*d*) O_2(air)

132. $N_2H_4 \rightarrow N_2$, This conversion is carried out in presence of -

(*a*) I_2 (*b*) KIO_3

(*c*) Fe^{3+} (*d*) All

133. The bond order of S–O bond in SO_2 is -

(*a*) 2 (*b*) 1.5

(*c*) 1 (*d*) 2.5

134. Which compound when reacts with SO_2 , non-redox reaction takes place ?

(*a*) Cl_2(g) (*b*) Fe^{3+} solution

(*c*) $KMnO_4$, H^+ (*d*) Na_2CO_3 solution

135. Which oxy acid of sulphur is not possible ?

(*a*) $H_2S_2O_7$

(*b*) H_2SO_5

(*c*) H_2SO_6

(*d*) $H_2S_2O_6$

136. For the following reaction,

$C_{12}H_{22}O_{11}(s) + H_2SO_4 + 1/2\ O_2(g) \rightarrow 11C(s) + CO_2(g) + 12H_2O + SO_2(g)$

which of the following statement is correct -

(*a*) Here H_2SO_4 acts as dehydrating as well as oxidising reagent

(*b*) The reaction is endothermic in nature

(*c*) The solution turns colourless

(*d*) Colourless and odourless gas is evolved

137. $X \xrightarrow{\Delta} Na_2SO_4 + Na_2S_5$

X is formed as one of the product when sulphur is boiled with caustic alkali. X is -

(*a*) Na_2SO_3 (*b*) $Na_2S_4O_6$

(*c*) $Na_2S_2O_3$ (*d*) Na_2S

138. Roasting salt cake with coke results -

(*a*) formation of mixture of CO_2 & S

(*b*) formation of mixture of CO_2 & Na_2S

(*c*) formation of mixture of CO & Na_2S

(*d*) formation of mixture of CS_2 & Na_2O

139. $FeCl_3$ when reacts with sodium thiosulphate , it gives intense purple colour complex X and then on standing the purple colour disappears. What is X and colour is disappeared because of -

(*a*) $X = [Fe(S_2O_3)_3]^{3-}$; colour is disappeared due to formation of Fe^{2+}

(*b*) $X = [Fe(S_2O_3)_2]^{-1}$; colour is disappeared due to formation of Fe^{2+}

(*c*) $X = [Fe(S_2O_3)_2]^{-1}$; colour is disappeared due to formation of $[Fe(S_2O_3)_2]$

(*d*) $X = [Fe(S_2O_3)_3]^{3-}$; colour is disappeared due to formation of $[Fe(S_2O_3)_2]^{4-}$

140. $Cl_2 + F_2 \xrightarrow{437K} X_1$ (equal volume)

$Cl_2 + 3F_2 \xrightarrow{573K} X_2$ (excess)

$I_2 + Cl_2 \longrightarrow X_3$ (excess)

Which of the following statements are correct -

(*a*) X_2 is colourless gas (*b*) X_3 is orange solid

(*c*) X_1 is colourless gas (*d*) All

141. Pb_3O_4 can not oxidise :-

(*a*) HCl (*b*) H_2SO_4

(*c*) HNO_3 (*d*) All

142. A scarlet red powder when reacts with HNO_3 , it gives chocolate brown precipitate. Scarlet red powder is :-

(*a*) PbO_2 (*b*) PbO

(*c*) Pb_3O_4 (*d*) Pb_2O_3

143. A scarlet red powder when reacts with HNO_3, it gives chocolate brown precipitate. Chocolate brown precipitate is :-

(*a*) PbO_2 (*b*) PbO

(*c*) Pb_3O_4 (*d*) Pb_2O_3

144. The number of lone pair on Cl in HOCl, $HClO_2$, $HClO_3$, $HClO_4$ are respectively :-

(*a*) 1,2,3,4 (*b*) 0,1,2,3

(*c*) 4,3,2,1 (*d*) 3,2,1,0

145. Number of Cl = O bonds present in HOCl, $HClO_2$, $HClO_3$, $HClO_4$ are respectively :- :-

(*a*) 1,2,3,4 (*b*) 0,1,2,3

(*c*) 4,3,2,1 (*d*) 3,2,1,0

146. Boric acid can act as strong acid by addition of :-

(*a*) Cis-1, 2-diol (*b*) Borax

(*c*) Trans-1,2-diol (*d*) Na_2HPO_4

147. In aqueous solution, orthoboric acid acts as :-

(*a*) Proton donor acid (*b*) Lewis acid

(*c*) Triprotic acid (*d*) Strong acid

148. The transition temperature for rhombic sulphur to monoclinic sulphur is :-

(*a*) 95.5°C (*b*) 112°C

(*c*) 160.5°C (*d*) 190°C

149. Correct bond dissociation energy order :-

(*a*) N≡N > P≡P (*b*) N–N > P–P

(*c*) O–O < S–S (*d*) All

150. Chlorofluoro carbon (freons) is represented as CF_mCl_n. It can be :-

(*a*) CF_2Cl_2 (*b*) $CFCl_3$

(*c*) $CClF_3$ (*d*) All

EXERCISE # II

❑ **One or More Than One Correct Answer :**

1. Which of the following statements are correct regarding $SnCl_2$?

(*a*) $SnCl_2$ conducts electricity

(*b*) $SnCl_2$ is dissolved in water to form turbidity of stannous oxychloride

(*c*) $SnCl_2$ is ionic solid

(*d*) $SnCl_2$ is covalent angular molecule

2. Which of the following reactions are correctly given ?

(*a*) $SnO_2 + 2H_2SO_4 \rightarrow Sn(SO_4)_2 + 2H_2O$

(*b*) $SnO_2 + 2NaOH \rightarrow Na_2SnO_2 + H_2O$

(*c*) $SnCl_4 + Hg \rightarrow Hg_2Cl_2 + SnCl_2$

(*d*) $SnCl_2 + Zn \rightarrow ZnCl_2 + Sn$

3. Which of the following names are correct :-

(*a*) Crystalline SnS_2 : Mosaic Gold

(*b*) $SnCl_4.5H_2O$: Butter of tin

(*c*) SnO_2 : Cassiterite

(*d*) SnH_4 : Stannane

4. SnS_2 is soluble in :-

(*a*) concentrated HCl (*b*) YAS

(*c*) H_2O (*d*) NH_3

5. Which of the following are example of mixed oxide?

(*a*) PbO (*b*) Pb_2O_3

(*c*) Pb_3O_4 (*d*) Pb_2O_2

6. Which of the following reaction are correct ?

(*a*) $PbO_2 + 4HCl \rightarrow PbCl_2 + 2H_2O + Cl_2$

(*b*) $2PbO_2 + 4H_2SO_4 \rightarrow 2PbSO_4 + 2H_2O + O_2$

(*c*) $PbO_2 + 2NaOH \rightarrow Na_2PbO_3 + H_2O$

(*d*) $2PbO_2 \xrightarrow{730°C} 2PbO + O_2$

7. Which can be formed as yellow precipitate ?

(*a*) $PbSO_4$ (*b*) PbI_2

(*c*) $PbCrO_4$ (*d*) $Pb(OH)_2 . PbCO_3$

8. Which of the following options are correct ?

(*a*) PbS is insoluble in hot concentrated HCl

(*b*) PbS is insoluble in boiling dilute HNO_3

(*c*) White lead is used as pigment

(*d*) $Pb(OH)_2$ is dissolved in acid as well as in base

9. Which of the following reaction give NH_3 gas :-

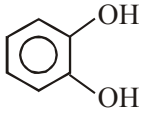
(*a*) Boron nitride is fused with potassium hydroxide

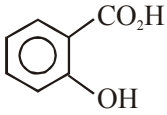
(*b*) Boron nitride reacts with F_2 gas

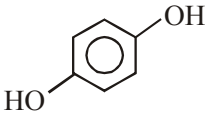
(*c*) Boron nitride undergoes hydrolysis

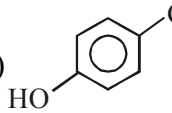
(*d*) Boron imide undergoes decomposition

10. Which of the following compound forms chelating oxy derivative with $B(OH)_4^-$:-

(*a*) Catechol ; 

(*b*)  ; Salicylic acid

(*c*) Quinol ; 

(*d*)  ; p-hydroxy benzoic acid

11. The oxidation state of hydrogen atom in $B_3N_3H_6$:-

(*a*) All hydrogens have same oxidation state of +1

(*b*) All hydrogens have same oxidation state of –1

(*c*) Hydrogens attached with boron have oxidation state of –1

(*d*) Hydrogens attached with nitrogen have oxidation state of +1

12. Which of the following statements are incorrect ?

(*a*) B–F bond length in BF_3 is less than B–F bond length in $NOBF_4$

(*b*) N–O bond length in NO is more than N–O bond length in $NOClO_4$

(*c*) The terminal B–H bond length in B_2H_6 is more than C–H bond length in C_2H_6

(*d*) The terminal B–H bond length in B_2H_6 is more than C–H bond length in C_2H_4

13. I_2 is soluble in KI solution but is insoluble in water because :-

(*a*) I_2 is soft lewis acid and I^- is hard lewis base

(*b*) I_2 is hard lewis acid and H_2O is hard lewis base

(*c*) I_2 is soft lewis acid and I^- is soft lewis base

(*d*) I_2 is soft lewis acid and H_2O is hard lewis base

14. Select correct statements :-

(*a*) Borax is used as buffer

(*b*) 1(M) borax solution reacts with equal volume of 2(M) HCl solution

(*c*) Titration of borax can be made using methyl orange as the indicator

(*d*) Coloured bead is obtained in borax bead test contains metaborate

15. The pair that yield same gaseous product on reaction with water are :-

(*a*) AlN, $CaCN_2$ (*b*) Ca & CaH_2

(*c*) F_2 & XeF_4 (*d*) K & KO_2

16. HNO_3 :-

(*a*) oxidises S to H_2SO_4

(*b*) oxidises P_4 to H_3PO_4

(*c*) oxidises Se to H_2SeO_3

(*d*) oxidises I_2 to HIO_3

17. Which of the following options are correct ?

(*a*) HF is the only hydra acid of halogen which does not form any precipitate with $AgNO_3$.

(*b*) Oxidising property of halogens $F_2 > Cl_2 > Br_2 > I_2$

(*c*) The bond dissociation energy of halogen $Cl_2 > Br_2 > F_2 > I_2$

(*d*) The bond dissociation energy of hydrogen halide HF > HCl > HBr > HI

18. Astatin is the element below iodine in the group VII A of the priodic table. Which of the following statements are not true for astatine ?

(*a*) It is more electronegatives than iodine

(*b*) It will exhibit only – 1 oxidation state

(*c*) Intermolecular forces between the astatine molecules will be more than that between iodine molecules.

(*d*) It is less electronegatives than iodine

19. Which statements are correct about halogens ?

(*a*) They are all diatomic and form univalent ions

(*b*) Halogens have the smallest atomic radii in their respective periods

(*c*) They are all diatomic and form divalent ions

(*d*) They are all reducing agent

20. Which of the following reactions are feasible ?

(*a*) $2KCl + I_2 \longrightarrow 2KI + Cl_2$

(*b*) $2KI + Cl_2 \longrightarrow 2KCl + I_2$

(*c*) $MnO_2 + 4HCl \longrightarrow MnCl_2 + Cl_2 + 2H_2O$

(*d*) $MnO_2 + 2NaBr + 2H_2SO_4 \longrightarrow Br_2 + 2Na^+ + Mn^{2+} + 2\,SO_4^{2-} + 2H_2O$

21. Which of the following statements are correct ?

(*a*) At ordinary temperature, the rate of disproportionation of hypohalites of chlorine , bromine and iodine follows the order $IO^- > BrO^- > ClO^-$.

(*b*) Fluorine can not be prepared in aqueous medium by electrolysis, since it decomposes water with liberation of ozonised oxygen.

(*c*) HI is a stronger acid than HBr because of the low dissociation energy of HI.

(*d*) In aqueous solution chlorine is a stronger oxidising agent than fluorine.

22. The products formed when potassium chlorate reacts with iodine.

(*a*) KIO_4 (*b*) KOI (*c*) KIO_3 (*d*) Cl_2

23. Correct order regarding HNO_3 and H_2SO_4 :-

(*a*) acidic strength $HNO_3 > H_2SO_4$

(*b*) boiling point $H_2SO_4 > HNO_3$

(*c*) oxidising power $HNO_3 > H_2SO_4$

(*d*) Volatility $HNO_3 > H_2SO_4$

24. Which of the following option are correct :-

(*a*) Zn when reacts with very dilute HNO_3 , it gives $Zn(NO_3)_2$ and NH_4NO_3

(*b*) $2SO_2(g) + O_2(g) \xrightarrow{\text{catalyst}} 2SO_3(g)$, it is an example of endothrmic reaction

(*c*) I_2 produces HIO_3 and NO_2 with concentrated HNO_3

(*d*) Ag when reacts with concentrated HNO_3 , it gives $AgNO_3$ and NO_2

25. Bronze when treated with hot concentrated HNO_3:-

(*a*) Cu and Zn both readily dissolves

(*b*) Copper is dissolved to give blue solution

(*c*) Sn is dissolved to give colourless solution $Sn(NO_2)_2$

(*d*) Tin is oxidised to metastannic acid in the form of white precipitate

26. Which of the following statements are incorrect ?

(*a*) To carry out brown ring test for nitrate ion, dilute H_2SO_4 should be used.

(*b*) To carry out brown ring test for nitrite ion, dilute H_2SO_4 should be used.

(*c*) Devarda's alloy is alloy of aluminium, copper and zinc where zinc percentage is maximum

(*d*) Copper strip is added in concentrated H_2SO_4, the solution become blue

27. Which of the following reactions give NH_3 gas ?

(*a*) $Zn + NaOH + NaNO_3 \xrightarrow{\Delta}$

(*b*) $(NH_4)_2CO_3 \xrightarrow{\Delta}$

(*c*) $NH_4ClO_4 \xrightarrow{\Delta}$

(*d*) $Al + NaOH + NaNO_3 \xrightarrow{\Delta}$

28. Which compound is not known ?

(*a*) NX_5 (*b*) BF_6^{3-} (*c*) HPO_2 (*d*) $NOBr_3$

29. Which of the following statements are correct -

(*a*) In ammonium nitrate, anionic part is sp^2 hybridised

(*b*) In ammonium nitrate, cationic part is sp^3 hybridised

(*c*) In ammonium nitrite , cationic part is sp^2 hybridised

(*d*) In ammonium nitrite , anionic part is sp^2 hybridised

30. Which of the following can not coexist with solution?

(*a*) $H_2S + SO_2$ (*b*) $Fe_2S_3 + HCl$

(*c*) $HNO_2 + KI$ (*d*) $Na_2CO_3 + NaHCO_3$

31. Which of the reaction produces PH_3 as one of the product?

(*a*) $Ca_3P_2 + H_2O \longrightarrow$

(*b*) $P_4(\text{white}) + NaOH + H_2O \longrightarrow$

(*c*) $PH_4I + KOH \longrightarrow$

(*d*) $H_3PO_2 \xrightarrow{\Delta}$

32. A (Calcium imide) $\xrightarrow{+H_2O}$ B + C(gas)

C (gas) $\xrightarrow{Ca(OCl)Cl}$ D(gas)

D (gas) $\xrightarrow{Mg}$ E $\xrightarrow{+H_2O}$ C(gas)

Correct option :-

(*a*) C gas is N_2O (*b*) D gas is N_2O_3

(*c*) C gas is N_2O_4 (*d*) D gas is N_2

33. F_2 reacts with H_2O to give :-

(*a*) HOF (*b*) HF

(*c*) O_2 (*d*) O_3

34. Which of the following statements are correct ?

(*a*) The hydride of group 15 elements act as oxidising agents

(*b*) The hydride of group 15 elements act as reducing agents

(*c*) The reducing power increases is going from NH_3 to BiH_3

(*d*) The basic character decreases in going from NH_3 to SbH_3

35. $CH_3 - CH = CH_2 \xrightarrow{HCl+H_2O_2} P_1$

$CH_3 - CH = CH_2 \xrightarrow{HBr+H_2O_2} P_2$

Correct statements :-

(*a*) P_1 is $CH_3CH_2CH_2Cl$

(*b*) P_1 is $CH_3CHClCH_3$

(*c*) P_2 is $CH_3CH_2CH_2Br$

(*d*) P_2 is $CH_3CHBrCH_3$

36. Which of the followings are diamagnetic ?

(*a*) H_2O_2 (*b*) O_3

(*c*) SO_2 (*d*) KO_3

37. Which of the followings reagent can be used to change the colour when SO_2 gas is passed ?

(*a*) Bromine water

(*b*) Acidified $FeCl_3$ solution

(*c*) Chlorine water

(*d*) Acidified $K_2Cr_2O_7$ solution

38. Ozone can oxidise :-

(*a*) K_2MnO_4 (*b*) $KMnO_4$

(*c*) S(moist) (*d*) Ag

39. Aqueous solution of which ion gives black precipitate in acidic medium when H_2S gas is passed through it :-

(*a*) Bi^{3+} (*b*) Pb^{2+}

(*c*) Cu^{2+} (*d*) Ag^{+}

40. Aqueous solution of which ion gives black precipitate in basic medium when H_2S gas is passed through it :-

(*a*) Fe^{2+} (*b*) Fe^{3+}

(*c*) Co^{2+} (*d*) Ni^{2+}

41. H_2O_2 can be prepared by :-

(*a*) Oxidation of 2-ethyl anthraquinol by air

(*b*) Electrolysis of 50% sulphuric acid

(*c*) CO_2 gas is passed through aqueous solution of barium peroxide

(*d*) Na_2O_2 is added to dilute H_2SO_4

42. When ammonia is gas is passed through suspension of gypsum in water and then passing in carbondioxide then the products formed can be :-

(*a*) H_2SO_4 (*b*) $(NH_4)_2CO_3$

(*c*) $CaCO_3$ (*d*) $(NH_4)_2SO_4$

43. NH_3 when reacts with Cl_2, then :-

(*a*) NCl_3 is formed when Cl_2 is present in excess

(*b*) N_2 is formed when Cl_2 is present in excess

(*c*) N_2 is formed when NH_3 is present in excess

(*d*) NCl_3 is formed when NH_3 is present in excess

44. $SO_2 + Cl_2 \rightarrow$ Compound X_1

$CO + Cl_2 \rightarrow$ Compound X_2

Correct statement regarding X_1 and X_2 ?

(*a*) X_1 is used to chlorinate alkane, eg. ethane to ethyl chloride

(*b*) X_2 is poisonous gas

(*c*) The oxidation state of sulphur in compound X_1 is +4

(*d*) The oxidation state of carbon in compound X_2 is +4

45. Dioxygen can be obtained in the laboratory by :-

(*a*) Heating potassium chlorate in presence of MnO_2 at high temperature

(*b*) Thermal decomposition of oxide of metal which is low in the electrochemical series, eg. Ag and Hg.

(*c*) Thermal decomposition of H_2O_2

(*d*) Thermal decomposition of $NaNO_2$

46. Which of the following statements are correct :-

(*a*) SiF_4 reacts with F^- to give SiF_6^{2-}

(*b*) $SiCl_4$ reacts with Cl^- to give $SiCl_6^{2-}$

(*c*) O–O bond in O_2F_2 is shorter as compared to O–O bond in H_2O_2

(*d*) O–F bond in O_2F_2 is longer as compared to O–F bond in OF_2

47. X + Coke powder $\xrightarrow{>2000°C}$ Y + 2CO↑

(3D-silicate)

Y + Coke powder $\xrightarrow{>2000°C}$ Z

What are the correct statements regarding Z ?

(*a*) All atoms of Z are sp^3 hybridised

(*b*) Z exhibits tetrahedral geometry

(*c*) Z is yellow solid at room temperature and colourless solid when impurity is present.

(*d*) Z is extremely hard substance used as abrassive

48. CO gas is absorbed by aqueous suspension of cuprous chloride forming the complex like $[CuCl(CO)(H_2O)_2]$.

Correct statement regarding this complex :-

(*a*) complex is tetrahedral

(*b*) complex is diamagnetic

(*c*) geometrical isomerism is not possible for this complex

(*d*) Chlorine atoms is separated by an angle 90° with respect to both water molecule

49. Which of the following ammonium salt give bronsted acid on heating ?

(*a*) NH_4NO_3 (*b*) $(NH_4)_2SO_4$

(*c*) $(NH_4)_2MoO_4$ (*d*) NH_4Cl

50. An element (X) has electronic configuration $1s^2 2s^2 2p^3$. Hydride of X is :-

(*a*) Water soluble

(*b*) Colourless gas

(*c*) Odourless gas

(*d*) Freezing point is 198.4K and 239.7K respectively

51. An element (X) has electronic configuration $1s^2 2s^2 2p^2$. Hydride of X is :-

(*a*) Colourless gas (*b*) Pungent odour gas

(*c*) Water insoluble (*d*) Water soluble

52. An element (*a*) has outermost electronic configuration $4s^2 4p^5$. Hydride of A is :-

(*a*) Strong base (*b*) Strong acid

(*c*) Brown colour gas (*d*) Colourless gas

53. Gun powder consists of :-

(*a*) $NaNO_3$ (*b*) KNO_3

(*c*) Sulphur (*d*) Charcoal

54. Whcih of the following statements are correct ?

(*a*) When dilute H_2SO_4 is added with potassium ferrocyanide, then CO gas is evolved

(*b*) When concentrated H_2SO_4 is added with potassium ferrocyanide, then HCN gas is evolved

(*c*) Urea, an nitrogenous organic matter when undergoes reaction with water, ammonia gas is evolved.

(*d*) For H_2SO_4, first dissociation constant ($K_{a_1} > 10$) is very high

55. F_2 reacts with alkali to give -

(*a*) HOF (*b*) O_3

(*c*) F_2O (*d*) O_2

56. $Ca_2B_6O_{11} + Na_2CO_3 \xrightarrow{\Delta} [X] + CaCO_3 + NaBO_2$ (Unbalanced equation)

Correct statement fo [X] :-

(*a*) Structure of anion of crystalline (X) has one boron atom sp^3 hybridised and other three boron atoms sp^2 hybridised

(*b*) (X) with NaOH(aq.) gives a compound which on reaction with H_2O_2 in alkaline medium yields a compound used as brightner in soaps

(*c*) Hydrolysis of (X) with HCl or H_2SO_4 yields a compound which on reaction with HF gives fluoroboric acid

(*d*) [X] on heating with cobalt salt in oxidising flame gives blue coloured bead

57. Which of the following reaction is correctly matched with product ?

(*a*) $C_2H_5OH + PCl_5 \rightarrow C_2H_5Cl + POCl_3 + HCl$

(*b*) $CH_3CO_2H + PCl_5 \rightarrow CH_3COCl + POCl_3 + HCl$

(*c*) $3CH_3CO_2H + PCl_3 \rightarrow 3CH_3COCl + H_3PO_3$

(*d*) $Sn + PCl_5 \rightarrow SnCl_2 + PCl_3$

58. $O_3 + 2H^+ + 2e^- \rightarrow H_2O + O_2$
$E° = 1.65$ volt

$O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$ $E° = 0.814$ volt

This value indicates :-

(*a*) O_2 & O_3 are reducing reagent

(*b*) O_2 & O_3 are oxidising reagent

(*c*) O_3 is stronger oxidising reagent than O_2

(*d*) O_2 is stronger oxidising reagent than O_3

59. Correct statements regarding H_2O_2 :-

(*a*) O–O bond length is 1.49Å

(*b*) Boiling point is 152°C

(*c*) $\angle HOO = 97°$

(*d*) Dipole moment is 2.01 Debye

60. In which of the following reactions , PCl_3 is formed as one of the product ?

(*a*) Reaction between P_4 and $SOCl_2$

(*b*) Reaction between P_4 and SO_2Cl_2

(*c*) Reaction between Ag and PCl_5

(*d*) Reaction between PH_3 and Ca(OCl)Cl

61. Correct statements regarding O_3 :-

(*a*) It is deep blue in liquid form

(*b*) It is violet black in solid form

(*c*) It has fishy smell

(*d*) Decomposition of $O_3 \rightarrow O_2$, entropy increases

62. Which of the following reaction give amorphous boron as product ?

(*a*) $B_2O_3 + 3Mg \rightarrow 3MgO + B$

(*b*) $3K + KBF_4 \rightarrow 4KaF + B$
(Potassium borofluoride)

(*c*) $B_2O_3 + 3H_2 \rightarrow 2B + 3H_2O$

(*d*) $2BCl_3 + 3H_2 \rightarrow 2B + 6HCl$

63. AlF_3 is different from other aluminium halide. This is illustrated by :-

(*a*) AlF_3 is only ionic halide but rest other halides are covalent in nature

(*b*) AlF_3 hydrolyses most readily but rest other halides do not undergo hydrolysis

(*c*) AlF_3 is unaffected water but other halides are easily hydrolysed

(*d*) AlF_3 has least boiling point among all aluminium halides

64. Br_2 when disproportionates in hot and concentrated NaOH solution, the products formed are :-

(*a*) NaBr (*b*) NaOBr

(*c*) $NaBrO_3$ (*d*) $NaClO_4$

65. Which of the following are example of amphoteric oxide ?

(*a*) CO (*b*) SnO

(*c*) GeO (*d*) PbO

66. Which of the following are example of acidic oxide?

(*a*) SiO_2 (*b*) PbO_2

(*c*) SnO_2 (*d*) GeO_2

67. Which of the following compound when dissolve in water, it gives alkaline solution ?

(*a*) Borax (*b*) Sodium sulphide

(*c*) K_2CO_3 (*d*) HCl

68. B_2H_6 is prepared by

(*a*) direct combination between elemental boron and gaseous H_2

(*b*) reaction between boron trifluoride and $LiAlH_4$ in ether medium

(*c*) reaction between boron trifluoride and NaH at 450 K

(*d*) Oxidation of sodium borohydride with I_2

69. Which of the following options are correct ?

(*a*) Concentrated HNO_3 can be transported in aluminium container

(*b*) Graphite is used as lubricant

(*c*) Diamond is used as abrassive

(*d*) Aluminium alloys are used to make aircraft body

70. Which structure exist with central atom sp^3d^2 hybridised ?

(*a*) SiF_6^{2-} (*b*) $SiCl_6^{2-}$

(*c*) $GeCl_6^{2-}$ (*d*) $SnOH_6^{2-}$

71. Which of the following options are correct ?

(*a*) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$, it is an example of endothermic reaction -

(*b*) In CO_2 molecule , resonance is possible

(*c*) H_2O is less polar than H_2O_2

(*d*) Number of chlorine atom present in mustard gas is two

72. Which of the following gases are supporter of combustion ?

(*a*) N_2O (*b*) CO_2

(*c*) CO (*d*) O_2

73. $BaSO_3 + H_2O_2 \rightarrow BaSO_4 + H_2O$
Precipitate P_1 Precipitate P_2

Correct option :-

(*a*) P_1 is white colour precipitate

(*b*) P_2 is white colour precipitate

(*c*) P_1 is soluble in dilute HCl

(*d*) P_2 is insoluble in dilute HCl and dilute HNO_3

74. Which of the following options are correct regarding N_2O_5 ?

(*a*) The total number of lone pair of electron in N_2O_5 is 10

(*b*) The total number of lone pair of electron in N_2O_5 is 12

(*c*) The total number of lone pairs of electron on nitrogen atom in N_2O_5 is 2

(*d*) The total number of lone pairs of electron on nitrogen atom in N_2O_5 is 0

75. Which of the following options are correct regarding member of group 14 elements

(*a*) Among all elements , carbon forms the most acidic oxide

(*b*) Among all elements , lead is most commonly found in +2 oxidation state

(*c*) Among all elements , silicon and germanium both are semiconductor

(*d*) Among all elements , tin has maximum melting point

76. Which property is not characterised by silicone ?

(*a*) High thermal stability

(*b*) Chemically resistant towards oxidation

(*c*) Water attracting in nature due to presence of polar group

(*d*) Water repelling due to presence of non polar alkyle group

77. An aqueous solution of gas (x) shows the following reaction.

(*a*) it turns rod litmus paper blue

(*b*) when added in excess of copper sulphate solution or deep blue colour is obtained

(*c*) on addition of the $FeCl_3$ solution, a brown precipitate, soluble in dilute HNO_3 is obtained

Correct options ?

(*a*) x is PH_3

(*b*) x is NH_3

(*c*) Brown precipitate is $Fe(OH)_3$

(*d*) Blue solution is $[Cn(NH_3)_6]^{2+}$

78. Correct statements regardidng carbide ?

(*a*) WC is example of interstitial carbide

(*b*) Mg_2C_3 is used in propyne preparation

(*c*) B_4C is used as abrasssive

(*d*) Cu_2C_2 & Ag_2C_2 are both white colour precipitate

79. $A + O_2 \xrightarrow{\Delta} B$(colourless gas)

$B \xrightarrow{air} C$ (Brown colour gas)

$B + C \longrightarrow D$

$D + H_2O \longrightarrow E$

E + KI solution $\longrightarrow$ Gas B formed.

A,B,C can be :-

(*a*) A,B,C can be NH_3, N_2O, N_2O_4

(*b*) E can be HNO_3

(*c*) A,B,C can be NH_3, NO, NO_2

(*d*) E can be HNO_2

80. An inorganic salt ,

(*a*) + KOH $\longrightarrow$ B gas + C(solution)

B gas + $CuSO_4$ solution $\longrightarrow$ Black precipitate

C (solution) + $CuSO_4$ $\longrightarrow$ White precipitate in brown solution.

Correct statements are :-

(*a*) A is NH_4Br

(*b*) White precipitate is CuBr

(*c*) A is PH_4I

(*d*) White precipitate is CuI

EXERCISE # III

❑ **Linked Comprehension Type :**

Passage for Q.1 to Q.3 :

Lead was known in ancient Egypt and Babylonia. It was largely used by Romans for water pipes. Native lead is occasionally found in traces but the cheilt are in galena PbS.

1. The sulphate mineral of lead is called :-

(*a*) Cerussite (*b*) Crocoisite

(*c*) Lamarcite (*d*) Anglesite

2. Lead is extracted from galena. Which of the following process in not involved for lead extraction.

(*a*) Froath floatation (*b*) Calcination

(*c*) Roasting (*d*) Smelting

Passage for Q.3 to Q.5 :

Orthoboric acid $\xrightarrow{100°C} P_1$

Orthophosphoric acid $\xrightarrow{220°C} P_4$

Orthoboric acid $\xrightarrow{140°C} P_2$

Orthophosphoric acid $\xrightarrow{320°} P_5$

Orthoboric acid $\xrightarrow[\text{heating}]{\text{very high temp.}} P_3$

Orthophosphoric acid $\xrightarrow[\text{temperature heating}]{\text{high}} P_6$

3. P_1 & P_4 are respectively :-

(*a*) $H_2B_4O_7$, HPO_3 (*b*) HBO_2 , HPO_3

(*c*) $H_2B_4O_7$, $H_4P_2O_7$ (*d*) HBO_2 , $H_4P_2O_7$

4. P_2 & P_5 are respectively :-

(*a*) $H_2B_4O_7$, HPO_3 (*b*) HBO_2 , HPO_3

(*c*) $H_2B_4O_7$, $H_4P_2O_7$ (*d*) HBO_2 , $H_4P_2O_7$

5. P_3 & P_6 are respectively :-

(*a*) B_2O_5 , P_2O_5 (*b*) B_2O_3 , P_4O_8

(*c*) B_2O_3 , P_2O_5 (*d*) B_2O_3 , P_2O_3

Passage for Q.6 to Q.7 :

A colourless solid A is formed on adding an ethereal solution of aluminium chloride to lithium hydride suspended in ether. A when reacts with BCl_3 & $SnCl_4$, products B and C are formed respectively. B is electron difficient but C is not. A is used as very strong reducing agnent and can be used widely in organic chemistry.

6. A when reacts with $CH_3CH = O$ & CH_3CO_2H , the products are formed respectively :-

(*a*) CH_3CH_2OH , $CH_3CH = O$

(*b*) CH_3CH_2OH , CH_3CH_2OH

(*c*) $CH_3CH = O$, CH_3CHO

(*d*) CH_3CH_2OH , $CH_3CH_2CH_2OH$

7. A reacts vigrongly with water to get :-

(*a*) $LiOH, Al(OH)_3, H_2O$

(*b*) $LiOH, Al(OH)_3, H_2$

(*c*) $LiOH, AlH_3$

(*d*) $LiH, Al(OH)_3$

8. $CH_3CH_2CN + A \longrightarrow P_1$

$CH_3CH_2NC + A \longrightarrow P_2$

P_1 & P_2 are related as :-

(*a*) functional isomers

(*b*) geometrical isomers

(*c*) chain isomers

(*d*) positional isomers

Passage for Q.9 to Q.11 :

A is colourless flammable gas which reduces CuO and when passed through a warm nickel tube forms a volatile liquid B. At high temperature and pressure, (*a*) reacts with aqueous NaOH to form a salt C. A reacts in stage with Cl_2 to give finally a highly explosive liquid D.

9. A is :-

(*a*) NO (*b*) CO

(*c*) CO_2 (*d*) SO_2

10. B is :-

(*a*) $Ni(CO)_4$ (*b*) $Fe(CO)_5$

(*c*) $Ni_2(CO)_{10}$ (*d*) $Ni(NO)_4$

11. C is :-

(*a*) $(CO_2Na)_2$ (*b*) CH_3CO_2Na

(*c*) HCO_2Na (*d*) Na_2CO_3

Passage for Q.12 to Q.13 :

A colourless solid (*a*) dissolves in water. The aqueous solution gives a white precipitate (*b*) when NaOH or NH_4OH is added. B dissolves in excess NaOH but not in excess NH_4OH.$BaCl_2$ solution is added to A , a white precipitate is formed which is insoluble in dilute HCl.

Solid A, when heated with Na_2CO_3 in a charcoal cavity, followed by addition of a few drops of cobalt nitrate solution in charcoal cavity and further heating (by blow pipe flame) leaves a blue residue C.

12. A is :-

(*a*) Al_2O_3 (*b*) $AlCl_3$

(*c*) $Al(NO_3)_3$ (*d*) $Al_2(SO_4)_3$

13. C is :-

(*a*) $CoAl_2O_3$ (*b*) $CoAl_2O_4$

(*c*) $CoAl_2O_6$ (*d*) $CO_2(SO_4)_3$

Passage for Q.14 to Q.16 :

Finely powdered colemnite is treated with boiling sodium carbonate solution when insoluble X_1 is precipitated and a mixture of X_2 & X_3 remains in the solution. The insoluble X_1 is separated by filtration. To have further yield, CO_2 gas is passed through X_3, where X_3 is converted into X_2.

14. X_1 is :-

(*a*) $CaCO_3$ (*b*) $NaBO_2$

(*c*) $Na_2B_4O_7$ (*d*) Na_2CO_3

15. X_2 is :-

(*a*) $CaCO_3$ (*b*) $NaBO_2$

(*c*) $Na_2B_4O_7$ (*d*) Na_2CO_3

16. X_3 is :-

(*a*) $CaCO_3$ (*b*) $NaBO_2$

(*c*) $Na_2B_4O_7$ (*d*) Na_2CO_3

Passage for Q.17 to Q.19 :

A (organic compound) + O_2 ⟶ B+C+D.

A does not react with $AgNO_3$ solution. A mixture of 70% A and 30% ether is used as an anaesthetic. B is neutral oxide which turns anhydrous $CuSO_4$ blue. Compound C turns lime water milky and produces an acidic solution with water. D is pungent smelling gas :-

17. A and D are respectively :-

(*a*) CH_2Cl_2, Cl_2 (*b*) $CHCl_3$, $COCl_2$

(*c*) $CHCl_3$, Cl_2 (*d*) CH_2Cl_2, $COCl_2$

18. B and C are respectively :-

(*a*) N_2O and CO (*b*) N_2O and CO_2

(*c*) H_2O and CO (*d*) H_2O and CO_2

19. $E \xrightarrow[2.H^+]{1.Cl_2+NaOH} HCO_2H + A$. E can be:-

(*a*) CH_3OH

(*b*) CH_3CH_2OH

(*c*) CH_3CHO

(*d*) both (*b*) and (*c*)

Passage for Q.20 to Q.22 :

A red liquid (*a*) when heated with concentrated hot NaOH gives a mixture of two salts (*b*) & (*c*) in the solution. The mixture when acidification with H_2SO_4 and distillation produces the red liquid (*a*) again. C has central atom with oxidation state +5.

20. Which is correct regarding liquid A ?

(*a*) it is sparingly soluble in water but readily soluble in ether ; alcohol

(*b*) it acts as an oxidising reagent

(*c*) it is used to identify unsaturation present in a compound

(*d*) all

21. Which of the following statement is correct for salt B ?

(*a*) it solution in water gives yellow precipitate with silver nitrate solution

(*b*) it solution in water gives yellow precipitate with lead nitrate solution

(*c*) both (*a*) and (*b*)

(*d*) it is basic compound

22. Which of the following statements are correct regarding C :-

(*a*) Central atom of anion of compound C has sp^3 hybridisation

(*b*) Anion of compound C is tetrahedral in shape

(*c*) Both (*a*) and (*b*)

(*d*) None of these

Passage for Q.23 to Q.25 :

White crystalline solid X_1 react with H_2 to form a highly associated liquid X_2 & monoatomic , colourless gas X_3. X_2 is used for etching glass.

$X_1 + H_2O \longrightarrow X_2 + X_4$ (diatomic gas) + X_3

The ionisation energies of X_3 & X_4 are almost equal.

$X_2 \xrightarrow[\text{molten state}]{\text{electrolysis in}} X_6$ (most reactive gas)

$X_6 + X_3 \longrightarrow X_1$ (2 : 1)

23. Correct statement regarding X_4.

(*a*) X_4 oxidises acidified $FeSO_4$ to $Fe_2(SO_4)_3$

(*b*) X_4 oxidises acidified $SnCl_2$ to $SnCl_4$

(*c*) X_4 oxidises sulphurous acid to sulphuric acid

(*d*) All

24. The compound X_1 when reacts with sulphur, it forms a compound where hybridisation state of sulphur atom is :-

(*a*) sp^3 (*b*) sp^3d

(*c*) sp^3d^2 (*d*) sp^3d^3

25. Highly associated liquid X_2 when reacts with boric acid it gives :-

(*a*) BF_3 (*b*) BCl_3

(*c*) BBr_3 (*d*) HBF_4

Passage for Q.26 to Q.28 :

A yellow solid (*a*) in unaffected by acids and base at room temperature. It is not soluble in water. It dissolves slowly in hot concentrated HNO_3 to give a brown gas (*b*). The solid (*a*) dissolves slowly in boiling solution of Na_2SO_3 giving a clear solution (*c*). Acidification of solution (*c*) causes a colourless gas (*d*). Upon concentration and cooling, solution (*c*) deposits as colourless crystals. Pentahydrate solution (*c*) is a reducing agents and reacts quantitatively with iodine solution (I_2 in KI) and acts as antichlor during bleaching:-

26. Solid A is :-

(*a*) P_4 (*b*) S_8

(*c*) Pb_3O_4 (*d*) PbO

27. Brown gas (*b*) & colourless gas (*d*) are respectively:-

(*a*) NH_3, PH_3 (*b*) NO_2, PO_3

(*c*) NO, PbO_2 (*d*) NO_2, SO_2

28. Solution C in the form of pentahydrate is :-

(*a*) $Na_2PbO_2 . 5H_2O$ (*b*) $Na_3PO_4 . 5H_2O$

(*c*) $Na_2S_2O_3 . 5H_2O$ (*d*) $NaNH_4HPO . 5H_2O$

Passage for Q.29 to Q.31 :

A compound of S, O, Cl (vapour density = 67.5) X reacts with KOH to give substance Y and Z. Y gives a white precipitate with $AgNO_3$ solution which is soluble in NH_4OH but insoluble in HNO_3. Z give a white precipitate with $BaCl_2$ which is insoluble in HCl or HNO_3. X is amporphous with a compound which is prepared by heating a mixtur of NaCl, $K_2Cr_2O_7$ and conc. H_2SO_4

29. X is :-

(*a*) $SOCl_2$ (*b*) SO_2Cl_2

(*c*) S_2Cl_2 (*d*) SO_3Cl

30. The product obtained by heating a mixture of NaCl, $K_2Cr_2O_7$ and concentrated H_2SO_4 is

(*a*) $CrCl_3$ (*b*) CrO_2Cl_2

(*c*) $CrOCl_2$ (*d*) CrO_3Cl

31. Y & Z are respectively :-

(*a*) KCl, K_2SO_3 (*b*) KCl, K_2SO_4

(*c*) ClO, KO_2 (*d*) KCl, K_2S

Passage for Q.32 to Q.34 :

Gas (X) is colourless diamagnetic with fishy smell. When X is cooled at –112°C, it condenses to a deep blue liquid which is dangerously explosive. X is one of the most powerful oxidising reagent. It is second to F_2 in oxidising power.

32. X is :-

(*a*) H_2O_2 (*b*) PH_3

(*c*) O_3 (*d*) Cl_2

33. When mercury is shaken with X, the metal adheres to the glass as a mirror. It is because of formation :-

(*a*) HgO (*b*) Hg_2O

(*c*) Hg_3P_2 (*d*) $HgCl_2$

34. Which of the following options are correct regarding X ?

(*a*) X oxidises black PbS into white colour of $PbSO_4$

(*b*) X oxidises stannous chloride into stannic chloride

(*c*) X is absorbed in turpentine oil

(*d*) All

Passage for Q.35 to Q.37 :

Compound (Z) on reduction with $LiAlH_4$ gives a hydride (X) containing 21.72% hydrogen. The one mole of hydride (X) reacts with 2 moles of ammonia at high temperature gives a compound (Y). (Z) hydrolyses incompletely and forms a compound (W) and H_3BO_3.

35. Correct statement regarding X :-

(*a*) the central atom of X has trigonal planar geometry

(*b*) all H-atoms in X are in the same plane

(*c*) a three centre two-electron bond is observed in X

(*d*) all M–H bond lengths are identical in X

36. The hybridisation in central atom of compound W is

(*a*) sp^2 (*b*) sp

(*c*) sp^3 (*d*) sp^3d

37. Correct statement regarding Z :-

(*a*) it has trigonal planar geometry

(*b*) the bond lengths between the central atom and the substituent atoms is shorter than the sum of the covalent radii.

(*c*) the coordination geometry around central atom in compound Z and in 1 : 1 complex of Z an NH_3 is same

(*d*) all of these

Passage for Q.38 to Q.40 :

A is a gas with vapour density 8.5. On catalytic oxidation in presence of Pt/Rh at high prssure and temperature it gives a colourless gas (*b*) which rapidly turns brown in air forming gas C. B and C both are paramagnetic in nature :-

38. A, B, C are respectively :-

(*a*) NH_3 , NO, NO_2 (*b*) NH_3 , N_2O_4, N_2O_3

(*c*) N_2H_4 , NO, NO_2 (*d*) NH_3 , NO_2, N_2O

39. C is dissolved in water to give X which is concentrated by distillation upto 68% by mass. X is :-

(*a*) HNO_2 and the above process to form X is called ostwald's process

(*b*) NH_3 and the above process to form X is called Haber's process

(*c*) HNO_2 and the above process to form X is called Birkeland - Eyde process

(*d*) HNO_3 and the above process to form X is called Birkeland - Eyde process

40. Gas C on cooling (< 0°) give :-

(*a*) N_2O_3(liquid) (*b*) N_2O_4(liquid)

(*c*) N_2O_4(vap.) (*d*) N_2O_4(solid)

Passage for Q.41 to Q.43 :

An unstable pale blue solution (P) which rapidly decomposes even in cold. The solution oxidises KI in acidic medium to liberate I_2. The solution also oxidises $SnCl_2$ in dilute HCl. P is oxidised by bromine water to form monobasic acid Q.

41. P is :-

(*a*) H_2CO_3 (*b*) HOCl

(*c*) HNO_2 (*d*) HNO_3

42. P when reacts with hydrazoic acid, it gives :-

(*a*) a mixture of N_2 and NO

(*b*) a mixture of N_2 and N_2O

(*c*) a mixture of N_2O and NO_2

(*d*) a mixture of NO and NO_2

43. P reacts with which of the following compound to release N_2 gas :-

(*a*) Urea (*b*) $CH_3CH_2NH_2$

(*c*) Sulphamic acid (*d*) All

Passage for Q.44 to Q.46 :

A colourless solid A when heated gives off a colourless gas B which is supporter of combustion. If heated in container the whole of the solid disappears. When A is heated with NaOH, an alkaline gas C is evolvd. When gas B is heated with sodamide, a colourless solid D is formed which furthur treated with dilute H_2SO_4 , a colourless liquid E is formed lead and silver salt of E are explosive.

44. A & B are :-

(*a*) NH_4NO_2 , N_2 (*b*) NH_4NO_3 , N_2O

(*c*) NH_4NO_2 ; NO_2 (*d*) $NaNO_3$, NO_2

45. C and E are respectively :-

(*a*) NH_3 , HNO_2 (*b*) NH_3 , HNO_3

(*c*) NH_3 , HN_3 (*d*) NH_3 , $H_2N_2O_2$

46. The anionic part of D is :-

(*a*) Linear (*b*) trigonal planar

(*c*) bent (*d*) tetrahedral

Passage for Q.47 to Q.49 :

A colourless solid X_1 melts at 44°C. When heated with aqueous KOH/NaOH, it gives off gaseous product X_2, which is spontaneously inflammable in air at about 150°C. If is powerful reducing agent.

47. X_2 when reacts with $CuSO_4$ then:-

(*a*) Red deposit of Cu is formed

(*b*) Black precipitate of Cu_3P_2 is formed

(*c*) Blue precipitate of Cu_3P_2 is formed

(*d*) S gets precipitated

48. X_2 when reacts with $AgNO_3$ then :-

(*a*) Brown precipitate of Ag_2O is formed

(*b*) Yellow soluton of Ag_3P is formed

(*c*) Black precipitate of metallic Ag is formed

(*d*) Black precipitate of Ag_2S is formed

49. X_1 and X_2 are respectively :-

(*a*) S_8 and H_2S (*b*) White P_4 and P_4O_{10}

(*c*) White P_4 and PH_3 (*d*) S_8 and SO_2

Passage for Q.50 to Q.53 :

$$HCOOH \xrightarrow[conc.H_2SO_4]{373K} H_2O + (X)$$

$$C(s) + H_2O \xrightarrow{423-1273K} (X) + H_2(g)$$

50. Select the correct statement about (X) :-

(*a*) (X) is a colourless, odourless and almost water insoluble gas

(*b*) (X) is highly poisonous and burns with blue flame

(*c*) When (X) gas is passed through $PdCl_2$ solution giving rise to black ppt.

(*d*) All of these

51. Mixture of (X) gas + H_2 is called :-

(*a*) Water gas or synthesis gas

(*b*) Producer gas

(*c*) Methane gas

(*d*) None of these

52. In second reaction when air is used instead of steam a mixed of (X) gas and N_2 is produced which called :-

(*a*) Water gas

(*b*) Synthesis gas

(*c*) Producer gas

(*d*) Carbond dioxide gas

53. Select the correct statement about (X) :-

(*a*) (X) gas is estimatated by I_2O_5

(*b*) Cu_2Cl_2 is absorber of (X) gas

(*c*) (X) gas is the purifying agent for Ni

(*d*) All of these

Passage for Q.54 to Q.55 :

$CH_3CH_2CN + H_2O \rightarrow P + NH_3$

$CH_3CH_2NC + H_2O \rightarrow CH_3CH_2NH_2 + Q$

54. P is :-

(*a*) $CH_3CH_2CO_2H$

(*b*) $CH_3CH_2CH_2OH$

(*c*) $CH_3CH_2CH_3$

(*d*) $CH_3CH_2CH_2NH_2$

55. Q is :-

(*a*) CO_2

(*b*) NH_3

(*c*) CH_4

(*d*) HCO_2H

Passage for Q.56 to Q.58 :

A Xenon fluoride X_1 is formed by heating Xenon with excess of fluorine at very high temperature and pressure. X_1 has a melting point 47.4°. X_1 can acts as fluoride ion donor as well as fluoride ion acceptor. X_1 undergoes hydrolysis vigorously forming an explosive compound X_2.

$X_2 + OH^-$ (pH > 10.5) $\rightarrow X_3$

$X_3 + OH^- \rightarrow X_4 + Xe + O_2 + H_2O$

56. X_1 is :-

(*a*) XeF_2

(*b*) XeF_4

(*c*) XeF_6

(*d*) None

57. X_2 is :-

(*a*) XeO_3

(*b*) XeO_4

(*c*) XeO_6

(*d*) XeO_2

58. X_3 and X_4 are respectively :-

(*a*) $HXeO_4^-$(perxenate ion) , XeO_6^{4-} (xenate ion)

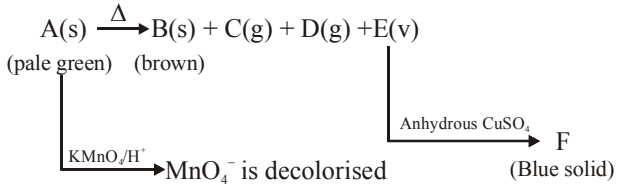
(*b*) $HXeO_4^-$(xenate ion) , XeO_6^{4-} (perxenate ion)

(*c*) XeO_6^{4-}(perxenate ion) , $HXeO_4^-$ (xenate ion)

(*d*) XeO_6^{4-}(xenate ion) , $HXeO_4^-$ (perxenate ion)

Passage for Q.59 to Q.60 :

Consider the following reaction(s)



$(a)_{aq.} \xrightarrow{NaNO_2+dil.HCl}$ unstable brown compound (G)

$(\mu = \sqrt{15}B.M.)$

59. Sum of oxidation state of the central atom in C(g) and D(g) is :-

(*a*) 6

(*b*) 10

(*c*) 8

(*d*) 4

60. Select incorrect statement about compound F :-

(*a*) It adsorb orange-red light for d-d transition

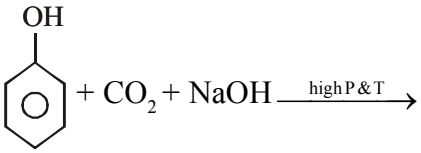
(*b*) 4 water molecule are directly bonded with each Cu^{+2}

(*c*) It is paramagnetic

(*d*) It's $\mu = \sqrt{8}B.M.$

Match the Column Type :

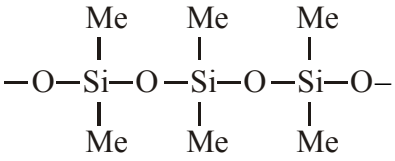
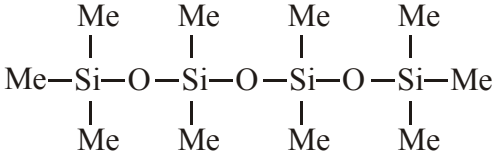
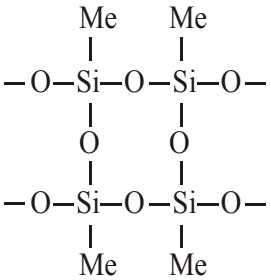
61. Match the column :-

Column-I **Reactions**	**Column-II** **Products / Use of products**
(*a*) Dry ice + CH_3MgX, $H^+ \rightarrow$	(P) Urea
(*b*) CO_2 + Gypsum solution + $NH_3 \rightarrow$	(Q) Monocarboxylic acid
(*c*) $CO_2 + NH_3 \xrightarrow{\text{high P \& T}}$	(R) Ammonium sulphate
(*d*) 	(S) Product used as fertiliser

62. Match the column :

Column-I	**Column-II**
(*a*) I.E. order	(P) He > Ne > Ar > Kr > Xe
(*b*) Boiling point order	(Q) He < Ne < Ar < Kr < Xe
(*c*) Oxidising property order	(R) $F_2 > Cl_2 > Br_2 > I_2$
(*d*) Acid dissociation constant	(S) O > S > Se > Te
	(T) $H_2Te > H_2Se > H_2S > H_2O$

63. Match the column :

Column-I **Different types of alkyl chlorosilkane**	**Column-II** **Products on hydrolysis**
(*a*) Me_2SiCl_2	(P) 
(*b*) Me_3SiCl	(Q) 
(*c*) $Me_2SiCl_2 + Me_3SiCl$	(R) 
(*d*) $MeSiCl_3$	(S) $Me_3Si - O - SiMe_3$

64. Match the column :

Column-I	**Column-II**
(*a*) XeO_3	(P) How lone pair of electron
(*b*) XeF_2	(Q) Acts as oxidising reagent
(*c*) XeF_4	(R) Undergoes hydrolysis with H_2O
(*d*) XeF_6	(S) Undergoes addition reaction
	(T) Give disproportionation reaction with H_2O or OH

65. Match the column :

Column-I **Compound**	**Column-II** **Features of product on treated with NaOH**
(*a*) XeF_2	(P) O_2 is formed as product
(*b*) $(NH_4)_2SO_4$	(Q) Disproportionation reaction
(*c*) P_4	(R) Product formed is inflammable and used in Holme's signal
(*d*) NO_2	(S) Product solution reacts with Zn dust and NH_3 gas is liberated
	(T) Atlest one product is pyramidal in shape

66. Match the column :

Column-I **Acids**	**Column-II** **Features**
(*a*) Hypophosphorus acid	(P) All hydrogens are ionisable in water
(*b*) Orthoboric acid	(Q) Monobasic acid
(*c*) Hypophosphoric acid ($H_4P_2O_6$)	(R) sp^3 hybridised atoms present
(*d*) Sulphurous acid (H_2SO_3)	(S) Central atom(s) contain are lone pair of electrons

67. Match the column :

Column-I **Compounds**	**Column-II** **Features**
(*a*) IF_5	(P) show self ionisation
(*b*) ClF_3	(Q) used as potential ionising solvent
(*c*) ICl	(R) slightly conducting
(*d*) I_2	(S) hybridisation of halogen atom is sp^3d in ionised state
	(T) hybridisation of halogen atom is sp^3d^2 in ionised state

68. Match the column :

Column-I **Reaction**	**Column-II** **Nature of reaction/Product**
(*a*) $SiCl_4 + H_2O \rightarrow$	(P) hydrogen halide formation
(*b*) $Cl_2 + H_2O \xrightarrow{h\nu}$	(Q) O_2 gas formation
(*c*) $XeF_4 + H_2O \rightarrow$	(R) redox reaction
(*d*) $H_2O_2 + ClO_2 + OH^- \rightarrow$	(S) nonredox reaction
	(T) One of the product has tetrahedral shape

69. Match the column :-

Column-I **Reaction**	**Column-II** **Product**
(*a*) $Cl_2O_6 + H_2O \rightarrow$	(P) ClO_2
(*b*) $NaClO_4 + HCl(conc.) \rightarrow$	(Q) $HClO_3$
(*c*) $KClO_3 + (CO_2H)_2 \rightarrow$	(R) Cl_2O
(*d*) $H_2O + Cl_2 \xrightarrow[573K]{}$	(S) $HClO_4$

70. Match the column :-

Column-I **Compound**	**Column-II** **Shape**
(*a*) ClF_3	(P) square pyramidal
(*b*) ICl_3	(Q) orange solid
(*c*) IF_5	(R) T shape
(*d*) IF_7	(S) Colourless gas
	(T) Colourless liquid

71. Match the column :-

Column-I **Reaction**	**Column-II** **Feature**
(*a*) $XeF_2 + H_2O \rightarrow$	(P) redox reaction
(*b*) $XeF_4 + H_2O \rightarrow$	(Q) disproportionation reaction
(*c*) $XeF_6 + H_2O \rightarrow$	(R) product formed is used for etching glass
(*d*) $XeF_3 + NaOH \rightarrow$	(S) Xe formation

72. Match the column :-

Column-I	**Column-II**
(*a*) $XeF_6 + SiO_2 \rightarrow$	(P) one of the product has square pyramidal shape
(*b*) $P_4(white) + SO_2Cl_2 \rightarrow$	(Q) one of the product has sp^3 hybridisation
(*c*) $H_2SO_4 + P_4O_{10} \rightarrow$	(R) one of the product has $p\pi$-$d\pi$ overlapping
(*d*) $XeF_6 + H_2O \rightarrow$	(S) one of the product has zero dipole moment

73. Match the column :-

Column-I **Reactions**	**Column-II** **Products formed**
(*a*) Sn + conc. $HNO_3 \rightarrow$	(P) NO
(*b*) Sn + dil. $HNO_3 \rightarrow$	(Q) NO_2
(*c*) Ag + conc. $HNO_3 \rightarrow$	(R) NH_4NO_3
(*d*) Ag + dil. $HNO_3 \rightarrow$	(S) $Sn(NO_3)_2$
	(T) $AgNO_3$

74. Match the column :-

Column-I **Compounds**	**Column-II** **Features**
(*a*) XeF_2	(P) Can act as Lewis acid
(*b*) XeF_4	(Q) Can act as Lewis base
(*c*) XeF_6	(R) On reaction with H_2O/OH^-, disproportionation can take place
(*d*) XeO_3	(S) Has at least one lone pair of electron
	(T) At least one lone pair of electron on central atom

75. Match the column :-

Column-I **Reactions**	**Column-II** **Nature of reaction/product**
(*a*) $(NH_4)_2S_2O_8 + H_2O \xrightarrow{\text{distillation}}$	(P) Hydrolysis
(*b*) $NaBO_2 + H_2O + H_2O_2 \xrightarrow{OH^-}$	(Q) One of the products has peroxide linkage
(*c*) $Ag_2S_2O_3 + H_2O \xrightarrow[\text{temperature}]{\text{fusion}}$	(R) Disproportionation
(*d*) 2-Ethyl anthraquinol+air $\longrightarrow$	(S) In one of the products the central atom has sp^3 hybridisation
	(T) One of the products is used as brightner in washing powder

76. Match the column :-

Column-I **Compounds**	**Column-II** **Features**
(*a*) H_2O_2	(P) Non-planar structure
(*b*) O_3	(Q) Planar structure
(*c*) H_2S	(R) Only reducing power
(*d*) SO_2	(S) Only oxidising power
	(T) Has oxidising as well as reducing power

77. Match the column :-

Column-I **Compounds**	**Column-II** **Features**
(*a*) Ca(OCl)Cl	(P) Cl has negative oxidation state
(*b*) Cl_2	(Q) Cl has positive oxidation state
(*c*) NaCl	(R) oxidising reagent
(*d*) Cl_2O_7	(S) dehydrating reagent
	(T) one of the product when Cl_2 gas is passed through basic solution

78. Match the column :-

Column-I **Reaction**	**Column-II** **Features**
(*a*) $N_2O_4 \xrightarrow{\Delta}$	(P) One of the product is a mixed anhydride
(*b*) $ClO_2 + O_3 \xrightarrow{H^+}$	(Q) One of the product is an acidic oxide
(*c*) $K_4[Fe(CN)_6] + H_2SO_4(conc.) + H_2O \longrightarrow$	(R) The oxidation state of the central atom of one of the product is +6
(*d*) $KOH + O_3 \longrightarrow$	(S) One of the product is colourless paramagnetic gas

79. Match the column :-

Column-I **Gas**	**Column-II** **Absorber**
(*a*) CO	(P) Turpentine oil
(*b*) O_2	(Q) Alkaline pyrogallol
(*c*) O_3	(R) Cu_2Cl_2+NaOH
(*d*) CO_2	(S) KOH

80. Match the column :-

Column-I **Allotropes**	**Column-II** **Features**
(*a*) Rhombic sulphur	(P) Consisting S_8 unit (8 member ring)
(*b*) Monoclinic sulphur	(Q) Most stable allotrope of phosphorous
(*c*) Black phosphorous	(R) Unstable and ordinary temperature
(*d*) White phosphorous	(S) Most stable allotrope of sulphur
	(T) Most reactive allotrope of phosphorous

81. Match the column :-

Column-I **Compounds**	**Column-II** **Products on heating**
(*a*) $LiNO_3$	(P) NH_3 gas is evolved
(*b*) HNO_2	(Q) Oxyacid is formed as one of the product
(*c*) $NaNH_4HPO_4.6H_2O$	(R) Disproportionation reaction takes place
(*d*) H_3PO_3	(S) O_2 gas is evolved
	(T) Oxides of nitrogen is evolved

82. Match the column :-

Column-I **Ammonium salt**	**Column-II** **Products on heating**
(*a*) NH_4IO_3	(P) N_2 gas
(*b*) NH_4ClO_4	(Q) O_2 gas
(*c*) NH_4NO_2	(R) N_2O gas
(*d*) NH_4NO_3	(S) Cl_2 gas
	(T) I_2 gas

83. Match the column :-

Column-I **Compound**	**Column-II** **Feature/Use**
(*a*) NH_2CONH_2	(P) Chlorinating reagent
(*b*) NH_2NH_2	(Q) Dehydrating reagent
(*c*) $SOCl_2$	(R) Rocket fuel
(*d*) H_2SO_4	(S) Nitrogeneous fertiliser

84. Match the column :-

Column-I **Reaction with ammonia**	**Column-II** **Observation**
(*a*) $Cu^{2+} + NH_3(\text{excess}) \rightarrow$	(P) Deep blue colour solution
(*b*) $AgCl + NH_3(\text{excess}) \rightarrow$	(Q) Brown precipitate
(*c*) $ZnSO_4 + NH_3(\text{less amount}) \rightarrow$	(R) Colourless solution
(*d*) $FeCl_3 + NH_3(\text{less amount}) \rightarrow$	(S) White precipitate
	(T) Complex formation

85. Match the column :-

Column-I	**Column-II**
Group Number	**Possible oxidation state**
(*a*) Group 13	(P) +3
(*b*) Group 14	(Q) –3
(*c*) Group 15	(R) +1
(*d*) Group 17	(S) –1
	(T) +4

86. Match the column :-

$S_2O_3^{2-}$ + Different metal ion $\rightarrow$ Complex

Column-I	**Column-II**
Formula of the complex	**Metal ion**
(*a*) $[M(S_2O_3)_3]^{3-}$	(P) Cu^{2+}
(*b*) $[M(S_2O_3)_2]^{2-}$	(Q) Bi^{3+}
(*c*) $[M_6(S_2O_3)_5]^{4-}$	(R) Pb^{2+}
(*d*) $[M(S_2O_3)_2]^{3-}$	(S) Hg^{2+}
	(T) Ag^{+1}

87. Match the column :-

Column-I	**Column-II**
Compound	**Features**
(*a*) N_2O_3	(P) Colourless gas
(*b*) N_2O_4	(Q) Colourless solid / liquid
(*c*) N_2O_5	(R) Blue solid
(*d*) N_2O	(S) Acidic oxide
	(T) Neutral oxide

88. Match the column :-

Column-I	**Column-II**
Compound	**Features**
(*a*) P_4O_6	(P) $p\pi$-$d\pi$ back bonding
(*b*) P_4O_{10}	(Q) $p\pi$-$p\pi$ back bonding
(*c*) N_2O_4	(R) M–O bond has partial double bond character
(*d*) N_2O	(S) Even number of lone pair of electron
	(T) Laughing gas

89. Match the column :-

Column-I	**Column-II**
Order	**Property**
(*a*) $SbH_3 > NH_3 > AsH_3 > PH_3$	(P) Thermal stability
(*b*) $NH_3 > PH_3 > AsH_3 > SbH_3$	(Q) HEH angle
(*c*) $NH_3 > SbH_3 > AsH_3 > PH_3$	(R) Boiling point
(*d*) $SbH_3 > AsH_3 > PH_3 > NH_3$	(S) Melting point
	(T) Reducing power

90. Match the column :-

Column-I **Compound**	**Column-II** **Bond parameters**
(*a*) N_2O_5	(P) N–N length is shortest
(*b*) N_2O_4	(Q) N–N length is highest
(*c*) N_2O_3	(R) N–O–N bond length is present and N–O bond length is highest
(*d*) N_2O	(S) All N–O bond lengths are identical
	(T) All N–O bond lengths are not identical

EXERCISE # IV

❑ **Integer Type :**

1. How many statements are correct regarding boron nitride :-

(*a*) It has a graphite like layer structure with hexagonal ring.

(*b*) B–N bond distance is 1.45Å and comparable to C–C bond distance in graphite which 1.42Å.

(*c*) Both B and N in boron nitride are sp^2 hybridised.

(*d*) It is soft and lubricantes

(*e*) It is a white infusible refractory solid.

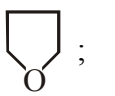
(*f*) It is formed by heating boron amide $B(NH_2)_3$. During this at first boron amide $B(NH_2)_3$ decomposes into boron imide $B_2(NH)_3$ and then converted into boron nitride.

2. In $B_3O_6^{3-}$ find out number of B–O–B linkage.

3. A comparative study of following properties between benzene and borazine are taken. For how many properties numerical data of benzene is more than borazene .

Melting point ; Boiling point ; Dipole moment ; Bond polarity ; Resonance energy ; Molecular weight

4. How many molecules result symmetrical cleavage of B_2H_6 molecule ?

CO ; $N(CH_3)_3$; $5(CH_3)_2$; $O(CH_3)_2$;  ; CH_3NH_2 ; $(CH_3)_2NH$

5. How many statement are correct ?

(*a*) H_3PO_3 is diprotic acid

(*b*) NF_3 is stable but NCl_3 and NI_3 are explosive

(*c*) PCl_5 is covalent in solid stable

(*d*) P–O bond length in $POCl_3$ is less than sum of the sigle bond covalent radii of P and O atom.

(*e*) Metaphosphorus acid (HPO_2) is not known.

(*f*) White phosphorous is more reactive than red phosphorous.

6. What is the value of n in alkyl substituted chlorisilane R_nSiCl_{4-n} , which is used for the preparation of cross linked silicone :-

7. Number of $p\pi$-$d\pi$ bonding present in XeO_4 .

8. Find out the number of hydrogen atoms attached to phosphorus atom in hypophosphorus acid is :-

9. $XeF_4 + H_2O \rightarrow P$(reduced product) + Q (oxidised product) + HF + O_2

What in the ratio of oxidation states of Xe in reduced and the oxidised products.

10. Find out the number of following oxy acid of phosphorus , where P–O–P bond is present :-

H_3PO_4 , H_3PO_5 , H_2PO_3, $H_3P_3O_9$, $H_4P_4O_{12}$

11. No. of S–S linkage in $S_3O_9 = m_1$

No. of P–P linkage in $(HPO_3)_3 = m_2$

No. of S–S linkage in $S_2O_8^{2-} = m_3$

No. of –O–O– linkage in $S_2O_6^{2-} = m_4$

Find out $m_1 + m_2 + m_3 + m_4$:-

12. How many reagents can be used to dry NH_3 gas:-

Concentrated H_2SO_4 ; P_4O_{10} ; CaO ; Anhydrous $CaCl_2$

13. How many statements are correct :-

(*a*) Argon is used in arc welding of metals or alloys to provide an inert atmosphere

(*b*) XeF_2, XeF_4, XeF_6 arc colourless crystalline solids and sublime readily at 298K.

(*c*) XeF_2, XeF_4, XeF_6 all can undergo hydrolysis.

(*d*) Se_2Cl_2 undergoes disproportionation to give $SeCl_4$ and Se.

(*e*) Dioxide like MnO_2, PbO_2 do not form H_2O_2 with dilute acids but they evolve O_2 with concentrated H_2SO_4

(*f*) Xenon fluoride reacts with fluoride ion acceptor to form cationic species of Xe and fluoride ion donors to form fluoro anion of Xe.

14. How many statement are incorrect :-

(*a*) Barium azide on heating gives pure nitrogen gas

(*b*) NH_3 + NaOCl (Sodium hypochlorite) $\rightarrow N_2$ (gas)

(*c*) Oxides of boron and silicon which are B_2O_3 and SiO_2 respectively, are basic in nature

(*d*) Oxides of aluminium (Al_2O_3) and gallium (Ga_2O_3) are amphoteric in nature

(*e*) Oxides of indium (In_2O_3) and thallium (Tl_2O_3) are acidic in nature

15. Find out the oxy acids of phosphorus in which phosphorus has lower oxidation state less than +5 contain either P–P or P–H bonds but not both in addition to P=O and P–OH bonds :-

H_3PO_2 ; H_3PO_3 ; $H_4I_2O_5$; $H_4P_2O_6$; $H_4P_2O_7$; $(HPO_3)_3$

16. How many total number of p-block elements produce H_2 gas with sodium hydroxide :-

Al, Sn, Pb, P, Zn

17. Among the following the total number of elements which undergo disproportionation reaction in NaOH :-

S_8, P_4, Cl_2, Br_2, N_2

18. How many pair of compounds gives Cl_2 gas:-

(*a*) $KCl + MnO_2 \longrightarrow$

(*b*) $NaCl + conc.H_2SO_4 \longrightarrow$

(*c*) $K_2Cr_2O_7 + HCl \longrightarrow$

(*d*) $KMnO_4$ + concentrated $HCl \longrightarrow$

(*e*) $Pb_3O_4 + HCl \longrightarrow$

(*f*) $NaCl + conc.\ H_3PO_4 \longrightarrow$

19. How many statements are correct ?

(*a*) XeF_5 is non existent

(*b*) For drying H_2S, concentrated H_2SO_4 can be used up.

(*c*) The inert boble gas which is not found in atmosphere in reaction.

(*d*) Metaphosphoric acid exists in polymeric cyclic structure.

(*e*) SO_2 bleaches the colour of article by reduction.

(*f*) Cl_2 bleaches the colour of article by oxidation.

(*g*) H_3PO_3 and H_3PO_4 both are reducing in nature.

(*h*) The first real compound of noble gas was made by Neil Bartlett.

(*i*) When deep red PtF_6 vapour was mixed with an equal volume of Xe, the gases combined immediately at room temperature to produce a yellow solid.

20. How many products can be common product when XeF_2 reacts with H_2O and XeF_4 reacts with H_2O :-

21. Number of $p\pi$-$d\pi$ bonding present in SO_3.

22. Total number of lone pairs of electrons present in $HClO_3$.

23. Number of $p\pi$-$p\pi$ bonding present in SO_2.

24. How many statements are correct regarding helium:-

(*a*) It is chemically inert & has very high thermal conductivity

(*b*) It has extremely low boiling point & very low viscocity

(*c*) It shows abnormal behaviour on liquification

(*d*) It is less soluble in blood than nitrogen under high pressure

(*e*) It can not form clathrate compound with quinol

(*f*) It is a inflammable heavy gas therefore it is used in filling balloons

(*g*) It is used to produce and sustain powerful super conducting magnets

(*h*) It is used as a cryogenic agent for carrying out experiments at low temperature

(*i*) Mixture of helium and oxygen are used as an aritificial air for divers and other under pressure.

(*j*) Because of its light weight and noninflammable character it is used in filling balbons.

25. Amongst the following, the total number of dimeric halides of group 16th elements which undergoes disproportionation is :-

S_2F_2, S_2Cl_2, S_2Br_2, Se_2Cl_2, Se_2Br_2

26.

27. The number of ionisable hydrogen prsent in NaH_2PO_2 :-

28. In which of the following all bond lengths are identical :-

CO_3^{2-}, PCl_5, SO_5^{2-}, NO_2, NO_3^-, BF_3, O_3, SO_2, HCO_3^-

29. Atomicity of sulphur in rhombic sulphur is X and atomicity of phosphorus in white phosphorus is Y then find out X – Y :-

30. The oxidation state of S in S_8, S_2F_2 and H_2S are x, y, z respectively. Find out x + 2y + z.

31. Alkyl substituted chlorosilane, $R_nSiCl_{(4-n)}$, on hydrolysis and then condensation polymerisation yields silicones. What is the value of n in the alkyl substituted chlorosilane used for the preparation of dimer silicone.

32. How many reactions give SO_2 gas as one of the product ?

(*a*) S + concentrated $H_2SO_4 \rightarrow$

(*b*) Zn + dilute $H_2SO_4 \rightarrow$

(*c*) Cu + concentrated $H_2SO_4 \rightarrow$

(*d*) $ZnS + O_2 \rightarrow$

(*e*) Cerussite undergo heating

(*f*) Carbon + conc. $H_2SO_4 \rightarrow$

33. 1 volume of concentrated HNO_3 and x volume of concentrated HCl mixture is called aqua regia. The value of x :-

34. How many reactions give nitric oxide gas one of the gaseous product ?

(*i*) $KI + HNO_3 \longrightarrow$

(*ii*) $H_2S + HNO_3 \longrightarrow$

(*iii*) $NO_3^- + Al + NaOH \longrightarrow$

(*iv*) $FeSO_4 + H_2SO_4(conc.) + HNO_3 \longrightarrow$

(*v*) $Au + HCl + HNO_3 \longrightarrow$

35. How many reactions give N_2 gas on heating :-

(*a*) $(NH_4)_2Cr_2O_7 \xrightarrow{\Delta}$

(*b*) $Ba(N_3)_2 \xrightarrow{\Delta}$

(*c*) $NaNO_2 + NH_4Cl \xrightarrow{\Delta}$

(*d*) $NH_4NO_3 \xrightarrow{\Delta}$

(*e*) HNO_3 vapours + Red hot copper $\longrightarrow$

36. No. of halide ions which change their oxidation number on hating with MnO_2 + conc.H_2SO_4 ?

F^-; Cl^-; Br^-; I^-

37. 1 mole each of H_3PO_2, H_3PO_3 and H_3PO_4 will neutrilise X mole of KOH, Y mole of $Mg(OH)_2$ and Z mole of $Cr(OH)_3$ (assuming all as strong electrolytes) respectivley. Find out the value of x+y+z ?

38. How many species does not contain peroxide ion?

PbO_2; BaO_2; SrO_2; Na_2O_2; KO_2; K_2O_2

39. How many reactions involving ozone give O_2 in product side ?

(*i*) $PbS(s) + O_3 \rightarrow$

(*ii*) $I^-(aq.) + O_3 \rightarrow$

(*iii*) $NO + O_3 \rightarrow$

(*iv*) $SnCl_2 + HCl + O_3 \rightarrow$

40. How many reagents reacts with H_2O_2 but not with ozone ?

$K_4[Fe(CN)_6]$; $K_3[Fe(CN)_6] + KOH$; PbS ; $SnCl_2 + HCl$; $KI + H^+$; $KMnO_4 + H^+$

41. How many sulphides are yellow in colour ?

CdS ; Sb_2S_3 ; As_2S_3 ; SnS ; SnS_2

42. In crystal of polymeric boric acid , ring is formed through hydrogen bonding. What is the member of the ring.

43. In three dimensional structure of SiO_2, rings are formed with alternate silicon and oxygen atoms. What is the member of the ring ?

44. Buckminster Fullerene (C_{60}) has x_1 vertices, x_2 six membered ring and x_3 five membered ring. Find out $\frac{x_1}{x_3} - \frac{x_1}{x_2}$.

45. In photosynthesis , green plants convert atmospheric CO_2 into carbohydrate, such as glucose. The overall chemical change can be expressed as

$$xCO_2 + yH_2O \xrightarrow[\text{chlorophyll}]{hv} C_6H_{12}O_6 + zO_2 + wH_2O$$

Find out x+z+w–y.

46. Xe can exhibit x_1, x_2, x_3, x_4 oxidation state in its compounds.

$x_1 < x_2 < x_3 < x_4$

Find out $x_4 - x_3$ if $x_4 - x_3 = x_3 - x_2 = x_2 - x_1$

47. A gas G occurs in Earth's stratosphere. X is diamagnetic. It has bond angle 116.5° and bond length 0.128 nm. Dry KOH reacts with G to yeild reddish brown precipitate. What is the molecular weight of G.

48. Total numbers of lone pair is present in $H_2P_2O_7$.

49. Total numbers of P–OH bond present in $H_4P_2O_6$.

50. Total numbers of P–OH bond present in $(HPO_3)_3$ if x, total numbers of P=O bond present in $(HPO_3)_3$ if y, total numbers of P–O–P bond present in $(HPO_3)_3$ if z then find out x+y+z ?

EXERCISE # V(A) JEE-MAIN

1. In case of nitrogen NCl_3 is possible but not NCl_5 while in case of phosphorus, PCl_3 as well as PCl_5 are possible. This is due to - **[AIEEE - 2002]**

(*a*) A vailability of vacant d-orbitals in P but not in N

(*b*) Lower electronegativity of P than N

(*c*) Lower tendency of H-bond formation in P than N

(*d*) Occurence of P in solid while N in gaseous state at room temperature

2. Which products are expected from the disproportionation of hypochlorous acid **-[AIEEE - 2002]**

(*a*) $HClO_3$ and Cl_2O (*b*) $HClO_2$ and HClO

(*c*) HCl and Cl_2O (*d*) HCl and $HClO_3$

3. Identify the incorrect statement among the following - **[AIEEE - 2002]**

(*a*) ozone reacts with SO_2 to give SO_3

(*b*) silicon reacts with NaOH(aq.) in the presence of air to give Na_2SiO_3 and H_2O

(*c*) Cl_2 reacts with excess of NH_3 to give N_2 and HCl

(*d*) Br_2 reacts with hot and strong NaOH solution to given NaBr , $NaBrO_4$ and H_2O

4. In XeF_2 , XeF_4 , XeF_6 the number of lone pairs on Xe is respectively **-[AIEEE - 2002]**

(*a*) 2,3,1 (*b*) 1,2,3

(*c*) 4,1,2 (*d*) 3,2,1

5. Aluminium is industrially prepared by - **[AIEEE - 2002]**

(*a*) Fused cryolite (*b*) Bauxite ore

(*c*) Alunite (*d*) Borax

6. For making good quality mirrors , plates of float glass are used. These are obtained by floating molten glass over a liquid metal which does not solidify before glass. The metal used can be - **[AIEEE - 2002]**

(*a*) Sodium (*b*) Magnesium

(*c*) Mercury (*d*) Tin

7. What may be expected when phosphine gas is mixed with chlorine gas - **[AIEEE - 2003]**

(*a*) PCl_5 and HCl are formed and mixture cools down

(*b*) PH_3 . Cl_2 is formed with warming up

(*c*) The mixture only cools down

(*d*) PCl_5 and HCl are formed and mixture warms up

8. Graphite is a soft solid lubricant extremely difficult to melt. The reason for this anomolous behaviour is that graphite - **[AIEEE - 2003]**

(*a*) has molecules of variable molecular masses like polymers

(*b*) has carbon atoms arranged in large plated of rings of strongly bonded carbon atoms with weak interplate bonds

(*c*) is a non crystalline substance

(*d*) is an allotropic from of diamond

9. Concentrated hydrochloric acid when kept in open air sometimes produces a cloud of white fumes. This is due to - **[AIEEE - 2003]**

(*a*) strong affinity of HCl gas for moisture in air results in forming of droplets of liquid solution which appears like a cloudy smoke

(*b*) due to strong affinity for water , conc. HCl pulls moisture of air towards self. The moisture forms droplets of water and hence the cloud

(*c*) conc. HCl emits strongly smelling HCl gas all the time

(*d*) oxygen in air reacts with emitted HCl gas to form a cloud of Cl_2 gas

10. Aluminium chloride exists as dimer, Al_2Cl_6 in solid state as well as in solution of non-polar solvents such as benzene. When dissolved in water , it gives **-[AIEEE - 2004]**

(*a*) $Al^{3+} + 3Cl^-$

(*b*) $[Al(H_2O)_6]^{3+} + 3Cl^-$

(*c*) $[Al(OH)_6]^{3-} + 3HCl^-$

(*d*) $Al_2O_3 + 6HCl$

11. The soldiers of Napolean army while at Alps during freezing winter suffered a serious problem as regards to the tin buttons of their uniforms. White metallic tin buttons get converted to grey powder. This transformation is related to **-[AIEEE - 2002]**

(*a*) An interaction with water vapour contained in humid air

(*b*) A charge in crystalline structure of tin

(*c*) A change in the partial pressure of O_2 in air

(*d*) An interaction with N_2 of air at low temperature

12. Which one of the following statements regarding helium is incorrect **-[AIEEE - 2004]**

(*a*) It is used to produce and sustain powerful superconducting magnets

(*b*) It is used as a cryogenic agent for carrying out experiments at low temperatures

(*c*) It is used to fill gas balloons instead of hydrogen because it is lighter than hydrogen and non-inflammable

(*d*) It is used in gas-cooled nuclear reactors

13. The number of hydrogen atoms attached to phosphorus atom in hypophosphorous acid is - **[AIEEE - 2004]**

(*a*) Zero (*b*) Two

(*c*) One (*d*) Three

14. The correct order of the thermal stability of hydrogen halide (H-X) is - **[AIEEE - 2005]**

(*a*) HI > HBr > HCl > HF

(*b*) HF > HCl > HBr > HI

(*c*) HCl > HF > HBr > HI

(*d*) HI > HCl > HF > HBr

15. The structur of diborane contains **-[AIEEE - 2005]**

(*a*) Four 2c-2e bonds and four 3c-2e bonds

(*b*) Two 2c-2e bonds and two 3c-2e bonds

(*c*) Two 2c-2e bonds and four 3c-2e bonds

(*d*) Four 2c-2e bonds and two 3c-2e bonds

16. Heating an aqueous solution of aluminium chloride to dryness will give - **[AIEEE - 2005]**

(*a*) $AlCl_3$ (*b*) Al_2Cl_6

(*c*) Al_2O_3 (*d*) $Al(OH)Cl_2$

17. Which one of the following is the correct statement **-[AIEEE - 2005]**

(*a*) Boric acid is a protonic acid

(*b*) Beryllium exhibits coordination number of six

(*c*) Chlorides of both beryllium and aluminium have bridged chloride structures in solid phase

(*d*) B_2H_6 , $2NH_3$ is known as "inorganic benzene"

18. In silicon dioxide - **[AIEEE - 2005]**

(*a*) each silicon atom is surrounded by four oxygen atoms and each oxygen atom is bonded to two silicon atoms

(*b*) each silicon atom is surrounded by two oxygen atoms and each oxygen atom is bonded to two silicon atoms

(*c*) silicon atom is bonded to two oxygen atoms

(*d*) there are double bonds between silicon and oxygen atoms

19. Regular use of which of the following fertilizer increases the acidity of soil **-[AIEEE - 2007]**

(*a*) Potassium nitrate

(*b*) Urea

(*c*) Superphosphate of lime

(*d*) Ammonium sulphate

20. The stability of dihalides of Si, Ge, Sn and Pb increases steadily in the sequence **-[AIEEE - 2007]**

(*a*) $GeX_2 << SiX_2 << SnX_2 << PbX_2$

(*b*) $SiX_2 << GeX_2 << PbX_2 << SnX_2$

(*c*) $SiX_2 << GeX_2 << SnX_2 << PbX_2$

(*d*) $PbX_2 << SnX_2 << SiX_2 << GeX_2$

21. Among the following substituted silanes the one which will give rise to cross linked silicone polymer on hydrolysis is - **[AIEEE - 2008]**

(*a*) R_4Si (*b*) $RSiCl_3$

(*c*) R_2SiCl_2 (*d*) R_2SiCl

22. Which one of the following reactions of Xenon compounds is not feasible **-[AIEEE - 2009]**

(*a*) $2XeF_2 + 2H_2O \rightarrow 2Xe + 4HF + O_2$

(*b*) $XeF_6 + RbF \rightarrow Rb[XeF_7]$

(*c*) $XeO_3 + 6HF \rightarrow XeF_6 + 3H_2O$

(*d*) $3XeF_4 + 6H_2O \rightarrow 2Xe + XeO_3 + 12HF + 1.5O_2$

23. Which of the following statements is wrong ? **[AIEEE - 2011]**

(*a*) Single N-N bond is weaker than the single P-P bond

(*b*) N_2O_4 has two resonance structures

(*c*) The stability of hydrides increases from NH_3 to BiH_3 in group 15 of the periodic table

(*d*) Nitrogen cannot form $d\pi$-$p\pi$ bond

24. Which of the following statements regarding sulphur is incorrect **- [AIEEE - 2011]**

(*a*) At 600°C the gas mainly consists of S_2 molecules

(*b*) The oxidation state of sulphur in nevel less than +4 in its compounds

(*c*) S_2 molecule is paramagnetic

(*d*) The vapour at 200°C consists mostly of S_8 rings

25. Boron cannot form whcih one of the following anions ? **[AIEEE - 2011]**

(*a*) $B(OH)_4^-$ (*b*) BO_2^-

(*3*) BF_6^{3-} (*d*) BH_4^-

26. In view of the signs of $\Delta_rG°$ for the following reactions -

$PbO_2 + Pb \rightarrow 2PbO$, $\Delta_rG° < 0$

$SnO_2 + Sn \rightarrow 2SnO$, $\Delta_rG° > 0$

Which oxidation states are more characteristic for lead and tin ? **[AIEEE - 2011]**

(*a*) For lead + 4 , for tin + 2

(*b*) For lead + 2 , for tin + 2

(*c*) For lead + 4 , for tin + 4

(*d*) For lead + 2 , for tin + 4

27. The number of S-S bonds in SO_3 , $S_2O_3^{2-}$, $S_2O_6^{2-}$ and $S_2O_8^{2-}$ respectively are - **[Jee Main-Online- 2012]**

(*a*) 1,0,1,0 (*b*) 0,1,1,0

(*c*) 1,0,0,1 (*d*) 0,1,0,1

28. Which one of the following depletes ozone layer **-[Jee Main-Online- 2012]**

(*a*) NO and freons (*b*) SO_2

(*c*) CO (*d*) CO_2

29. In which of the following arrangements, the sequence is not strictly according to the property written against it **-[Jee Main-Online- 2012]**

(*a*) $CO_2 < SiO_2 > SnO_2 > PbO_2$: increasing oxidising power

(*b*) B < C > O > N : increasing first ionisation enthalpy

(*c*) $NH_3 < PH_3 > AsH_3 > SbH_3$: increasing basic strength

(*d*) HF < HCl > HBr > HI : increasing acid strength

30. The compound of Xenon with zero dipole moment is **-[Jee Main-Online- 2012]**

(*a*) XeO_3 (*b*) XeO_2

(*c*) XeF_4 (*d*) $XeOF_4$

31. The formation of molecular complex $BF_3 - NH_3$ results in a change in hybridisation of boron **-[Jee Main-Online- 2012]**

(*a*) from sp^3 to sp^3d (*b*) from sp^2 to dsp^2

(*c*) from sp^3 to sp^2 (*d*) from sp^2 to sp^3

32. Trigonal bipyramidal geometry is shown by

-[Jee Main-Online- 2013]

(*a*) XeO_3F_2 (*b*) $XeOF_2$

(*c*) $[XeF_8]^{2-}$ (*d*) $FXeOSO_2F$

33. Oxidation state of sulphur in anions SO_3^{2-}, $S_2O_4^{2-}$ and $S_2O_6^{2-}$ increases in the orders

-[Jee Main-Online- 2013]

(*a*) $S_2O_6^{2-} < S_2O_4^{2-} < SO_3^{2-}$

(*b*) $SO_3^{2-} < S_2O_4^{2-} < S_2O_6^{2-}$

(*c*) $S_2O_4^{2-} < SO_3^{2-} < S_2O_4^{2-}$

(*d*) $S_2O_4^{2-} < S_2O_6^{2-} < SO_3^{2-}$

34. XeO_4 molecule is tetrahedral having

-[Jee Main-Online- 2013]

(*a*) Two pπ-dπ bonds

(*b*) Four pπ-dπ bonds

(*c*) One pπ-dπ bond

(*d*) Three pπ-dπ bonds

35. The shape of IF_6^- is

-[Jee Main-Online- 2013]

(*a*) Trigonally distorted octahedron

(*b*) Pyramidal

(*c*) Octahedral

(*d*) Square antiprism

36. The catenation tendency of C, Si and Ge is in the order Ge < Si < C. The bond energies (in kJ mol^{-1}) of C–C, Si–Si and Ge–Ge bonds are respectively

-[Jee Main-Online- 2013]

(*a*) 348, 260, 297 (*b*) 348, 297, 260

(*c*) 297, 348, 260 (*d*) 260, 297, 348

37. The gas evolved on heating CaF_2 and SiO_2 with concentrated H_2SO_4, on hydrolysis gives a white gelatinous precipitate. The precipitate is

-[Jee Main-Online- 2014]

(*a*) Silica gel (*b*) Silicic acid

(*c*) hydrofluosilicic acid (*d*) calciumfluorosilicate

38. Shape of certain interhalogen compounds are stated below. Which one of them is not correctly stated - **[Jee Main-Online- 2014]**

(*a*) IF_7 : Pentagonal bipyramid

(*b*) BrF_5 : Trigonal bipyramid

(*c*) ICl_3 : Planar dimeric

(*d*) BrF_3 : Planar T-shaped

39. Which of the following series correctly represents relations between the elements from X to Y ?

$X \rightarrow Y$ **[Jee Main-Online- 2014]**

(*a*) $_{18}Ar \rightarrow {}_{54}Xe$Noble character increases

(*b*) $_3Li \rightarrow {}_{19}K$Ionisation enthalpy increases

(*c*) $_6C \rightarrow {}_{32}Ge$Atomic radii increases

(*d*) $_9F \rightarrow {}_{35}Br$Electron gain enthalpy with negative sign increases

40. Which of the following statements about the depletion of ozone layer is correct

-[Jee Main-Online- 2014]

(*a*) the problem of ozone depletion is more serious at poles because ice crystals in the clouds over poles act as catalyst for photochemical reactions involving the decomposition of ozone by $Cl^{\bullet}$ and $ClO^{\bullet}$ radicals

(*b*) the problem of ozone depletion is less serious at poles because NO_2 solidifies and is not available for consuming $ClO^{\bullet}$ radicals

(*c*) Oxides of nitrogen also do not react with ozone in stratosphere

(*d*) Freons, chlorofluorocarbons, are inert chemically, they do not react with ozone in stratosphere

41. Which of the following xenon-OXO compounds may not be obtained by hydrolysis of xenon fluorides **-[Jee Main-Online- 2014]**

(*a*) XeO_2F_2 (*b*) XeO_3

(*c*) XeO_4 (*d*) $XeOF_4$

42. Hydrogen peroxide acts both as an oxidising and as a reducing agent depending upon the nature of the reacting species. In which of the following cases H_2O_2 acts as a reducing agent in acid medium

-[Jee Main-Online- 2014]

(*a*) MnO_4^- (*b*) SO_3^{2-}

(*c*) KI (*d*) $Cr_2O_7^{2-}$

43. Consider the reaction

-[Jee Main-Online- 2014]

$H_2SO_{3(aq)} + Sn^{4+}{}_{(aq)} + H_2O_{(l)} \rightarrow Sn^{2+}{}_{(aq)} + HSO_4^-{}_{(aq)} + 3H^+{}_{(aq)}$

Which of the following statement is correct ?

(*a*) H_2SO_3 is the reducing agent because it undergoes oxidation

(*b*) H_2SO_3 is the reducing agent because it undergoes reduction

(*c*) Sn_4^+ is the reducing agent because it undergoes oxidation

(*d*) Sn_4^+ is the oxidizing agent because it undergoes oxidation

44. The number and type of bonds in C_2^{2-} ion in CaC_2 are **-[Jee Main-Online- 2014]**

(*a*) two σ bonds and one π bond

(*b*) two σ bonds and two π bonds

(*c*) one σ bonds and two π bonds

(*d*) one σ bond and one π bond

45. In the following sets of reactants which two sets best exhibit the amphoteric character of $Al_2O_3.xH_2O$? **[Jee Main-Online- 2014]**

Set-1 : $Al_2O_3.xH_2O(s)$ and $OH^-(aq)$

Set-2 : $Al_2O_3.xH_2O(s)$ and $H_2O(\ell)$

Set-3 : $Al_2O_3.xH_2O(s)$ and $H^+(aq)$

Set-4 : $Al_2O_3.xH_2O(s)$ and $NH_3(aq)$

(*a*) 1 and 2 (*b*) 2 and 4

(*c*) 1 and 3 (*d*) 3 and 4

46. Example of a three-dimensional silicate is

-[Jee Main-Online- 2014]

(*a*) Beryls (*b*) Zeolites

(*c*) Feldspars (*d*) Ultramarines

47. Which of the following compounds has a P–P bond ? **[Jee Main-Online- 2015]**

(*a*) $H_4P_2O_5$ (*b*) $(HPO_3)_3$

(*c*) $H_4P_2O_7$ (*d*) $H_4P_2O_6$

48. Chlorine water on standing loses its colour and forms **-[Jee Main-Online- 2015]**

(*a*) HCl and $HClO_2$ (*b*) HCl only

(*c*) HOCl and HCl_2 (*d*) HCl and HOCl

49. Which among the following is the most reactive ?

[Jee Main - 2015]

(*a*) I_2 (*b*) ICl

(*c*) Cl_2 (*d*) Br_2

50. Which one has the highest boiling point ?

[Jee Main - 2015]

(*a*) Kr (*b*) Xe

(*c*) He (*d*) Ne

51. From the following statements regarding H_2O_2, choose the incorrect statement :

-[Jee Main-2015]

(*a*) it has to be stored in plastic or wax lined glass bottles in dark

(*b*) it has to be kept away from dust

(*c*) it can act only as an oxidizing agent

(*d*) it decomposes on exposure to light

EXERCISE # V(B) JEE-ADVANCED

Fill in the Blanks

1. The hydrolysis of alkyl substituted chlorosilanes given ..... **[IIT-1991]**

2. The hydrolysis of trialkylchlorosiane R_3 SiCl, yields ..... **[IIT-1994]**

3. Two types of bonds present in B_2H_6 are covalent and ..... **[IIT-1994]**

4. One recently discovered allotrope of carbon (e.g., C_{60}) is commonly known as ..... **[IIT-1994]**

True/False

5. Carbon tetrachloride burns in air when lighted to give phosgene. **[IIT-1983]**

6. Graphite is a better lubricant on the moon than on the earth. **[IIT-1987]**

7. All the Al – Cl bonds in Al_2Cl_6 are equivalent. **[IIT-1989]**

8. Diamond is harder than graphite. **[IIT-1993]**

9. The basic nature of the hydroxides of group 13 (Gr. IIIB) decreases progressively down the group. **[IIT-1993]**

10. The tendency for catenation is much higher for C than for Si. **[IIT-1993]**

11. Complete and balance the following chemical equations - **[IIT-1998, 2M]**

(*i*) $P_4O_{10} + PCl_5 \rightarrow$

(*ii*) $SnCl_4 + C_2H_5Cl + Na \rightarrow$

12. Work out the following using chemical equations **[IIT-1998, 2M]**

"Chlorination of calcium hydroxide produces bleaching powder"

13. Hydrogen peroxide acts both as an oxidizing and a reducing agent in alkaline solution towards certain first row transition metal ion. Illustrate both these properties of H_2O_2 using chemical equations **-[IIT-1998, 4M]**

14. In the contact process for industrial manufacture of sulphuric acid, some amount of sulphuric acid is used as a starting material. Explain briefly. What is the catalyst used in the oxidation of SO_2? **[IIT-1998, 4M]**

15. Give reasons in one or two sentences for each of the following : **[IIT-1985]**

(*i*) Graphite is used as a solid lubricant

(*ii*) Fluorine cannot be prepared from fluorieds by chemical oxidation.

16. Write balanced equations for : **[IIT-1990]**

(*i*) The preparation of crystalline silicon from $SiCl_4$

(*ii*) The preparation of phosphine from CaO and white phosphorus

(*iii*) The preparation of ammonium sulphate from gypsum, ammonia and carbon dioxide

17. Anhydrous $AlCl_3$ is covalent. From the data given below, predict whether it would remain covalent or become ionic in aqueous solution. **[IIT-1997]**

Iinisation energy for Al = 5137 kJ mol^{-1}

$\Delta H_{hydration}$ for Al^{3+} = 5137 kJ mol^{-1}

$\Delta H_{hydration}$ for Cl^- = –381 kJ mol^{-1}

18. Aluminium sulphide gives a fourl odour when it becomes damp. Write a balanced chemical equation for the reaction :- **[IIT-1997]**

19. Draw the structure of a cyclic silicate, $(Si_3O_9)^6$ with proper labelling- **[IIT-1998]**

20. Give reason for the following in one or two sentences only. **[IIT-1999]**

"$BeCl_2$ can be easily."

21. Draw the molecular structures of XeF_2, **XeF_4** and XeO_2F_2, indicating the location of lone pair(s) of electrons. **[IIT-2000]**

22. Give reason : **[IIT-2000]**

Why elemental nitrogen exists as a diatomic molecule whereas elemental phosphorus is a tetra atomic molecule.

23. Givan an example of oxidatioln of one halide by another halogen. Explain the feasibility of the reaction. **[IIT-2000]**

24. Compound X on reduction with $LiAlH_4$ gives a hydride Y containing 21.72 % hydrogen alongwith other products. The compound Y reacts with air explosively resulting in boron trioxide. Identify X and Y. Given balanced reactions involved in the formation of Y and its reaction with air draw the structure of Y. **[IIT-2001]**

25. Starting from $SiCl_4$, prepare the following in steps not exceeding the number given in parenthesis (reactions only) **[IIT-2001]**

(*i*) Silicon (1)

(*ii*) Linear silicon containing methyl group only (4)

(*iii*) Na_2SiO_3 (3)

26. Write the balanced chemical equation for developing photographic films. **[IIT-2001]**

27. Identify(X) in the following synthetic scheme and write their structures. **[IIT-2001]**

$$Ba\overset{*}{C}O_3 + H_2SO_4 \longrightarrow X(gas)\ (C\ denotes\ C^{14})$$

28. Write the balanced equations for the reactions of the following compounds with water**[IIT-2002]**

(*i*) Al_4C_3 (*ii*) CaNCN

(*iii*) BF_3 (*iv*) NCl_3

(*v*) XeF_3

29. Write the balanced equations for the reactions of the following compounds with water **[IIT-2002]**

(*i*) Al_4C_3 (*ii*) CaNCN

(*iii*) BF_3 (*iv*) NCl_3

(*v*) XeF_4

30. Identify the following **[IIT-2003]**

$$NaCO_3 \underset{aq.}{\xrightarrow{SO_2}} A \xrightarrow{Na_2CO_3} B \xrightarrow[\Delta]{\text{elemental S}} C \xrightarrow{I_2} D$$

Also mentioln the oxidation state of S in all the compounds.

31. Arrange the following oxide in the increasing order of Bronsted basicity. **[IIT-2004]**

Cl_2O_7, BaO_7, SO_3, CO_2, B_2O_3

32. When zeolite , which is hydrated sodium aluminium, is treated with hard water, the sodium ions are exchanged with : **[IIT-1990]**

(*a*) H^+ ions (*b*) Ca^{2+} ions

(*c*) SO_4^{2-} ions (*d*) Mg^{2+} ions

33. Which of the following halides is least stable and has doubtful existence : **[IIT-1996]**

(*a*) CCl_4 (*b*) GeI_4

(*c*) SnI_4 (*d*) PbI_4

34. In compounds of type ECl_3 , where E = B, P, As or Bi, the angles Cl–E–Cl for different E are in the order : **[IIT-1999]**

(*a*) B > P = As = Bi (*b*) B > P > As > Bi

(*c*) B < P = As = Bi (*d*) B < P < As < Bi

35. The number of P—O—P bonds in cyclic tetrametaphosphoric acid is : **[IIT-2000]**

(*a*) zero (*b*) two

(*c*) three (*d*) four

36. The correct order of acidic strength is : **[IIT-2000]**

(*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*) $K_2O > CaO > MgO$

37. Amongest H_2O, H_2S, H_2Se and H_2Te , the one with the highest boiling point is : **[IIT-2000]**

(*a*) H_2O because of hydrogen bonding

(*b*) H_2Te because of higher molecular weigtht

(*c*) H_2S because of hydrogen bonding

(*d*) H_2Te because of lower molecular weigtht

38. Ammonia can be dried by : **[IIT-2000]**

(*a*) conc. H_2SO_4 (*b*) P_4O_{10}

(*c*) CaO (*d*) Anhydrous $CaCl_2$

39. Which of the following are hydrolysed : **[REE-2000]**

(*a*) NCl_3 (*b*) BCl_3

(*c*) CCl_4 (*d*) $SiCl_4$

40. The set with correct order of acidity is : **[IIT-2001]**

(*a*) $HClO < HClO_2 < HClO_3 < HClO_4$

(*b*) $HClO_4 < HClO_3 < HClO_2 < HClO$

(*c*) $HClO < HClO_4 < HClO_3 < HClO_2$

(*d*) $HClO_4 < HClO_2 < HClO_3 < HClO$

41. The reaction ,

$$3ClO^-(aq) \rightarrow ClO_3^-(aq) + 2Cl^-(aq)$$

is an example of : **[IIT-2001]**

(*a*) oxidatioln reaction

(*b*) reduction reaction

(*c*) disproportionation reaction

(*d*) decomposition reaction

42. The number of S-S bonds in sulphur trioxide trimer, (S_3O_9) is : **[IIT-2001]**

(*a*) three (*b*) two

(*c*) one (*d*) zero

43. Specify the coordination geometry around and hybridisation of N and B atoms in a 1:1 complex of BF_3 and NH_3 : **[IIT-2001]**

(*a*) N : tetrahedral sp^3 ; B: tetrahedral sp^3

(*b*) N : pyramidal sp^3 ; B: pyramidal sp^3

(*c*) N : pyramidal sp^3 ; B: planar sp^3

(*d*) N : pyramidal sp^3 ; B: tetrahedral sp^3d

44. **Statement–1 :** Between $SiCl_4$ and CCl_4 , only $SiCl_4$ reacts with water. **[IIT-2001]**

Statement–2 : $SiCl_4$ is ionic and CCl_4 is covalent.

(*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, Staicment–2 is False

(*d*) Statement–1 is False, Statement–2 is True

45. Polyphosphate are used as water softening agents because they : **[IIT-2002]**

(*a*) form soluble complexes with anionic species

(*b*) precipitate anionic species

(*c*) form soluble complexes with cationic species

(*d*) precipitate cationic species

46. Identify the correct order of solubility of Na_2S, CuS and ZnS in aqueous medium : **[IIT-2002]**

(*a*) $CuS > ZnS > Na_2S$

(*b*) $ZnS > Na_2S > CuS$

(*c*) $Na_2S > CuS > ZnS$

(*d*) $Na_2S > ZnS > CuS$

47. Identify, the correct order of acidic strength of CO_2, CuO, CaO, H_2O : **[IIT-2002]**

(*a*) $CaO < CuO < H_2O < CO_2$

(*b*) $H_2O < CuO < CaO < CO_2$

(*c*) $CaO < H_2O < CuO < CO_2$

(*d*) $H_2O < CO_2 < CaO < CuO$

48. H_3BO_3 is : **[IIT-2002,3]**

(*a*) monobasic acid and weak Lewis acid

(*b*) monobasic acid and weak Bronsted acid

(*c*) monobasic acid and strong Lewis acid

(*d*) monobasic acid and strong Bronsted acid

49. When I^- is oxidised by MnO_4^- in alkaline medium, I^- convertes into : **[IIT-2003]**

(*a*) IO_3^- (*b*) I_2

(*c*) IO_4^- (*d*) IO^-

50. Match the column : **[IIT-2003]**

Column-I	Column-II
(*a*) $Bi^{3+} \rightarrow (BiO)^+$	(P) Heat
(*b*) $[AlO_2]^- \rightarrow Al(OH)_3$	(Q) Hydrolysis
(*c*) $SiO_4^{4-} \rightarrow Si_2O_7^{6-}$	(R) Acidification
(*d*) $(B_4O_7^{2-}) \rightarrow [Bi(OH)_3]$	(S) Dilution by water

51. $(Me)_2SiCl_2$ on hydrolysis will produce : **[IIT-2003]**

(*a*) $(Me)_2Si(OH)_2$

(*b*) $(Me)_2Si = O$

(*c*) $[—O—(Me)_2Si—O—]_n$

(*d*) $Me_2SiCl(OH)$

52. Which is the most thermodynamically stable allotropic form of phosphorus : **[IIT-2004]**

(*a*) red (*b*) white

(*c*) black (*d*) yellow

53. When PbO_2 reacts with conc.HNO_3 the gas evolved is : **[IIT-2005]**

(*a*) NO_2 (*b*) O_2

(*c*) N_2 (*d*) N_2O

54. Which of the following is not oxidised by O_3 : **[IIT-2005]**

(*a*) KI (*b*) $FeSO_4$

(*c*) N_2O_4 (*d*) N_2O_5

55. Which blue liquid is obtained on reacting equimolar amounts of two gases at –30°C? **[IIT-2005]**

(*a*) N_2O (*b*) N_2O_3

(*c*) N_2O_4 (*d*) N_2O_5

56. Name of the structure of silicates in which three oxygen atoms of $[SiO_4]^{4-}$ are shared is : **[IIT-2005]**

(*a*) Pyrosilicate

(*b*) Sheet silicate

(*c*) linear chain silicate

(*d*) three dimensional silicate

57. $B(OH)_3 + NaOH \rightleftharpoons NaBO_2 + Na[B(OH)_4] + H_2O$ how can this reaction is made to proceed in forward direction ? **[IIT-2006]**

(*a*) addition of cis 1, 2 diol

(*b*) addition of borax

(*c*) addition of trans 1, 2 diol

(*d*) addition of Na_2HPO_4

58. The percentage of p-character in the orbitals forming P-P bonds in P_4 is : **[IIT-2007]**

(*a*) 25 (*b*) 33

(*c*) 50 (*d*) 75

59. Among the following , the paramagnetic compound is : **[IIT-2007]**

(*a*) Na_2O_2 (*b*) O_3

(*c*) N_2O (*d*) KO_2

60. **Statement–1 :** Boron always forms covalent bond. **[IIT-2007]**

Statement–2 : The small size of B^{3+} favours formation of covalent bond.

(*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, Staicment–2 is False

(*d*) Statement–1 is False, Statement–2 is True

61. Statement–1 : In water, orthoboric acid behaves as a weak monobasic acid. **[IIT-2007]**

Statement–2 : In water, orthoboric acid acts as a proton donor.

(*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, Staicment–2 is False

(*d*) Statement–1 is False, Statement–2 is True

Passage for Q.62 to Q.64 :

The noble gases have closed - shell electronic configuration and are monoatomic gases under normal conditions. The low boiling point of the lighter noble gases are due to weak dispersion forces between the atoms and the absence of other interatomic interaction. The direct reaction of xenon with fluorine leads to a series of compounds with oxidation number +2, +4 and +6.

XeF_4 reacts violently with water to give XeO_3. The compounds of xenon exhibit rich stereochemistry and their geometries can be deduced considering the total number of electron pairs in the valance shell.

[IIT-2007]

62. Argon is used in are welding because of its :

(*a*) low reactivity with metal

(*b*) ability to lower the melting point of metal

(*c*) flammability

(*d*) high calorific value

63. The structure of XeO_3 is :

(*a*) linear (*b*) planar

(*c*) pyramidal (*d*) T-shaped

64. XeF_4 and XeF_6 are expected to be :

(*a*) oxidising (*b*) reducing

(*c*) unreactive (*d*) strongly basic

Passage for Q.65 to Q.67 :

There are some deposits of nitrates and phosphates in earth's crust. Nitrates are more soluble in water. Nitrates are difficult to reduce under the laboratory conditions but microbes do it easily. Ammonia forms large number of complexes with transition metal ions. Hybridisation easily explains the case of sigma donation capability of NH_3 and PH_3. Phosphine is a flammable gas and is prepared from white phosphorus.

[IIT-2008]

65. Among the following , the correct statement :

(*a*) phosphates have no biological significance in humans

(*b*) between nitrates and phosphates , phosphates are less abundant in earth's crust

(*c*) between nitrates and phosphates , nitrates are less abundant in earth's crust

(*d*) oxidation of nitrates is possible in soil

66. Among the following , the correct statement :

(*a*) Between NH_3 and PH_3, NH_3 is a better electron donor because the lone pair of electrons occupies spherical 's' orbital and is less directional.

(*b*) Between NH_3 and PH_3, NH_3 is a better electron donor because the lone pair of electrons occupies spherical 'sp^3' orbital and is more directional.

(*c*) Between NH_3 and PH_3, NH_3 is a better electron donor because the lone pair of electrons occupies 'sp^3' orbital and is more directional.

(*d*) Between NH_3 and PH_3, NH_3 is a better electron donor because the lone pair of electrons occupies spherical 's' orbital and is less directional.

67. The phosphorus on reaction with NaOH gives PH_3 as one of the products. This is a :

(*a*) dimerization reaction

(*b*) disproportionation reaction

(*c*) condensation reaction

(*d*) precipitation reaction

68. The reaction of P_4 with X leads selectively to P_4O_6. The X is : **[IIT-2009]**

(*a*) Dry O_2

(*b*) A mixture of O_2 , N_2

(*c*) Moist O_2

(*d*) O_2 in the presence of aqueous NaOH

69. The nitrogen oxide(s) the contain(s) **N-N bond(s) is (are) :-** **[JEE-2009]**

(*a*) N_2O (*b*) N_2O_3

(*c*) N_2O_4 (*d*) N_2O_5

70. In the reaction $2X + B_2H_6 \rightarrow [BH_2(X)_2]^+[BH_4]^-$ the amine(s) X is (are) **[JEE-2009]**

(*a*) NH_3 (*b*) CH_3NH_2

(*c*) $(CH_3)_2NH$ (*d*) $(CH_3)_3N$

71. The reaction of white phosphorus with aqueous NaOH gives phosphine along with another phosphorus containing compound. The reaction type ; the oxidation states of phosphorus in phospine and the other product are respectively : **- [JEE-2012]**

(*a*) redox reaction ; –3 and –5

(*b*) redox reaction ; +3 and +5

(*c*) disproportionation reaction ; –3 and +1

(*d*) disproportionation reaction ; –3 and +3

72. Bleaching powder contains a salt of an oxoacid as one of its components. The anhydride of that oxoacid is :- **[JEE-2012]**

(*a*) Graphite is harder than diamond

(*b*) Graphite has higher electrical conductivity than diamond

(*c*) Graphite has higher thermal conductivity than diamond

(*d*) Graphite has higher C–C bond than diamond

74. Concentrated nitric acid upon long standing, turns yellow-brown due to the formation of :- **[JEE-2013]**

(*a*) NO (*b*) NO_2

(*c*) N_2O (*d*) N_2O_4

75. The correct statement(s) about O_3 is (are) :- **[JEE-2013]**

(*a*) O–O bond lengths are equal

(*b*) Thermal decomposition of O_3 is endothermic

(*c*) O_3 is diamagnetic in nature

(*d*) O_3 has bent structure

Passage for Q.76 to Q.77 :

The reaction of Cl_2 gas with cold dilute and hot concentrated NaOH in water give sodium salt of two (different) oxoacids of chlorine P and Q respectively. The Cl_2 gas reacts with SO_2 gas, in presence of charcoal to give a product R. R reacts with white phosphorus to give a compounds S. On hydrolysis, S gives as oxyacid of phosphorus T. **[JEE-2013]**

76. R, S and T respectively are :

(*a*) SO_2Cl_2, PCl_5 and H_2PO_4

(*b*) SO_2Cl_2, PCl_3 and H_3PO_3

(*c*) SO_2Cl_2, PCl_3 and H_3PO_2

(*d*) SO_2Cl_2, PCl_5 and H_3PO_4

77. P and Q , respectively , are the sodium salts of :

(*a*) Hypochlorus and chloric acid

(*b*) Hypochlorus and chlorus acid

(*c*) Chloric and perchloric acid

(*d*) Chloric and hypochlorus acid

78. The unbalanced chemical reactions given in List-I show missing reagent or condition (?) which are provided in List-II. Match the List-I with List-II and select the correct answer using the code given below the lists : A :- **[JEE-2013]**

List-I

(P) $PbO_2 + H_2SO_4 \xrightarrow{?} PbSO_4 + O_2 +$ other product

(Q) $Na_2S_2O_3 + H_2O \xrightarrow{?} NaHSO_4 +$ other product

(R) $N_2H_4 \xrightarrow{?} \overset{o}{N}_2 +$ other product

(S) $XeF_2 \xrightarrow{?} Xe +$ other product

List-II

(*i*) NO

(*ii*) I_2

(*iii*) Warm

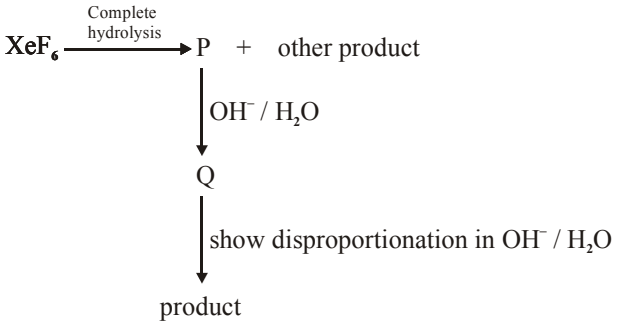
(*iv*) Cl_2

Codes :

	P	Q	R	S
(*a*)	1	2	3	1
(*b*)	3	2	1	4
(*c*)	1	4	2	3
(*d*)	3	4	2	1

79. Under ambient conditions, the total number of gases released as products in the final steo of the reaction scheme shown below is :-

[JEE-Adv. 2014]



(*a*) 0 (*b*) 1

(*c*) 2 (*d*) 3

80. The product formed in the reacton of $SOCl_2$ with white phosphorus is :- **[JEE-Adv. 2014]**

(*a*) It behaves as a weak acid in water due to self ionization

(*b*) Acidity of its aqueous solution increases upon addition of ethylene glycol

(*c*) It has a three dimensional structure due to hydrogen bonding

(*d*) It is a weak electrolyte in water

82. The correct statement(s) regarding (i) HClO, (ii) $HClO_2$, (iii) $HClO_3$ and (iv) $HClO_4$ is (are) :-

[JEE-Adv. 2015]

(*a*) The number of Cl = O bonds in (ii) and (iii) together is two

(*b*) The number of lone pairs of electron on Cl in (ii) and (iii) together is three

(*c*) The hybridisation of Cl in (iv) is sp^3

(*d*) Amongest (i) to (iv), the strongest acid is (i)

83. When O_2 is adsorbed on a metallic surface, electron transfer occurs from the metal to O_2. The TRUE, statements regarding this adsorption is (are) :- **[JEE-Adv. 2015]**

(*a*) O_2 is physisorbed

(*b*) heat is released

(*c*) occupancy of π^*_{2p} of O_2 is increased

(*d*) bond length of O_2 is increased

84. Under hydrolytic conditions , the compounds used for preparation of linear polymer and for chain termination , respectvley, are :- **[JEE-Adv. 2015]**

(*a*) CH_3SiCl_3 and $Si(CH_3)_4$

(*b*) $(CH_3)_3SiCl$ and $(CH_3)_2SiCl_2$

(*c*) $(CH_3)_2SiCl_2$ and CH_3SiCl_3

(*d*) $SiCl_4$ and $(CH_3)_3SiCl$

85. Three moles B_2H_6 are completely reacted with methanol. The number of moles of boron containing product formed is :- **[JEE-Adv. 2015]**

86. The total number of lone pairs of electron in N_2O_3 is :- **[JEE-Adv. 2015]**

■■