INDIAN SCHOOL, ALGHUBRA
XII STD INORGANIC CHEMISTRY
P block elements- WORK SHEET

1 ACCOUNT FOR THE FOLLOWING

1. E^0 Tl^{3+}/ Tl^+ have positive value.
2. In (I) oxide is more stable than In (III) oxide.
3. Anhydrous $AlCl_3$ acts as a catalyst.
4. Group 13 elements form electron deficient compounds called Lewis acid.
5. Lewis acid character is $BF_3 < BCl_3 < BBr_3 < BI_3$
6. Cryolite is added during the electrolysis of aluminium oxide.
7. $AlCl_3$ forms a dimer but not BCl_3.
8. $AlCl_3$ dissolves in excess of NaOH to give a clear solution.
9. $PbCl_2$ is more stable than $PbCl_4$
10. PbO_2 acts as an oxidising agent.
11. CO_2 is a gas while SiO_2 is a solid.
12. Silicon can not form graphite like structure.
13. Silicon forms silanes and not compounds of the type alkenes and alkynes.
14. CCl_4 can not be hydrolysed but $SiCl_4$ can be hydrolysed.
15. Silicon can form hexa coordinated compounds and not carbon.
16. $(SiF_6)^{2-}$ are known but not $(SiCl_6)^{2-}$.
17. Catenation property in group 14 decreases on going down the group.
18. N_2 is a gas while P_4 is a solid.
19. Nitrogen molecule is chemically inert.
20. Nitrogen do not show much of catenation.
21. PCl_5 in solid state exhibit ionic character.
22. PCl_3 and PCl_5 fumes in moist air.
23. All the five bonds in PCl_5 are not equivalent.
24. PCl_5 is more reactive and less stable than PCl_3
25. PCl_5 is known but not NCl_5.
26. Phosphoric acid is tri protic acid while phosphorus acid is diprotic.
27. H_3PO_2 is mono protic acid.
28. Basic character is $NH_3 > PH_3 > AsH_3 > SbH_3 > BiH_3$
29. Oxygen does not exhibit catenation but sulphur exhibit to a greater extent.
30. Oxygen molecule is a gas while sulphur is a solid.
31. SF_6 molecule can not be hydrolysed easily.
32. Sulphur in vapour state is paramagnetic,
33. Concentrated sulphuric acid acts as an oxidising agent.
34. Sulphuric acid is a dibasic acid.
35. H_2O (l) has higher boiling point than H_2S.

36. Water is a liquid while hydrogen sulphide is a gas at room temperature.
37. Hydrogen sulphide is a weak dibasic acid.
38. Acidic character is $H_2O<H_2S<H_2Se< H_2Te$
39. Thermal stability is $CO_2>CS_2>CSe_2>CTe_2$
40. Acidity of hydrogen halide is HI>HBr>HCl>HF.
41. HF has higher boiling point than HCl.
42. Boiling point HF>HI>HBr>HCl.
43. Electro negativity of group 16 elements decreases down the group.
44. Electro negativity of group 17 elements decreases down the group.
45. F_2 molecule has lower bond energy than Cl_2 molecule.
46. Chlorine has higher electron affinity than fluorine.
47. Inter halogen compounds are more reactive than halogens from which they are made.
48. Silicon and phosphorous can form hexa coordinated compounds.
49. Acidic character is $HClO_4 >HClO_3 >HClO_2>HOCl$
50. Catenation property of group 14 decreases on going down the group.
51. Red phosphorus is less reactive than white phosphorus.
52. Oxidising power of halogens decreases on going down the group.
53. HBr and HI can not be prepared by the reaction of metal bromide or iodide with concentrated H_2SO_4.
54. Oxides of chlorine are bleaching agents.
55. Noble gases are chemically unreactive.
56. Xe form compounds only with fluorine and oxygen.
57. Bartlet synthesized $Xe(PtF_6)$ from the earlier known compound O_2 (PtF_6).
58. Xe does not form compounds like XeF,XeF_3,and XeF_5
59. SF_6 is known but not SH_6.
60. Phosphorus forms hexa coordinated compounds but not nitrogen.
61. Acidity HOCl>HOBr>HOI
62. Al becomes passive in conc HNO_3
63. Pb becomes unreactive on exposure to air.
64. Size of Ga is smaller than that of Al.

65. HF is least volatile while HCl is most volatile.
66. Sugar chars in concentrated sulphuric acid.
67. Xenon is the only noble gas known to form compounds.
68. Fluorine will never be the central atom in the inter halogen compounds
69. Bartlett synthesized first noble compound $XePtF_6$ from the knowledge of Earlier known compound O_2 PtF_6

2. Arrange the following in the increasing order of property mentioned against each set:
   a) HF, HCl, HBr, HI- acidity
   b) H_2O, H_2S, H_2Se,H_2Te- acidity
   c) H_2O, H_2S, H_2Se,H_2Te – boiling point

d) HF, HCl, HBr, HI- volatility
e) As_2O_3, Ga_2O_3, Ge_2O_3, ClO_2- acidity
f) NH_3, PH_3, AsH_3, SbH_3, BiH_3-basicity
g) MF, MCl, MBr, MI- Ionic character
h) LiF, NaF, KF, RbF, CsF- Ionic character
i) HOCl, HOBr, HOI- acidity
j) HOCl, HOClO,$HOClO_2$, $HOClO_3$ – acidity

3 Give the structures of the following compounds:

1) Diborane 2) aluminium chloride 3) boron tri chloride
4) SiF_4 5) SiF_6^{2-} 6) ortho silicate 7) pyro silicate (Island structure)
8) $Si_3O_9^{6-}$ 9) $Si_6O_{18}^{12-}$ (beryl) 10) linear chain silicate 11) $(Si_2O_5^{2-})_n$
12) NH_3 13) NF_3 14) PCl_3 15) PCl_5 16) P_4O_6 (Phosphorus trioxide)
17) P_4O_{10} (Phosphorus pentoxide) 18) H_3PO_4 (Ortho phosphoric acid)
19) H_3PO_3 (Phosphonic acid) 20) H_3PO_2(Hypo phosphorous acid)
21) $H_4P_2O_6$ (Hypo phosphoric acid) 22) Cyclic tri meta phosphoric acid
23) Linear tri meta phosphoric acid 24) red phosphorus n) white phosphorus.
25) SF_4 26) SF_6 27) SO_2(g) 28) SeO_2(s) 29) SO_3(s) 30)) SeO_3(s)
31) Sulphuric Acid H_2SO_4 32) Sulphorous Acid H_2SO_3
33) Thio Sulphuric Acid $H_2S_2O_3$
34) Peroxomono Sulphuric Acid H_2SO_5 35) Peroxodi Sulphuric Acid $H_2S_2O_8$
36) Dithionic Acid $H_2S_2O_6$ 37) Pyro Sulphuric Acid (Oleum) $H_2S_2O_7$ 38) S_6 39) S_8
40) OF_2 41) Chloric(I) Acid 42) Chloric(III) Acid 43) Chloric(v) Acid
44) Chloric(VII) Acid 45) IF_3 46) IF_5 47) IF_7 48) ClF_2^+ 49) BrF_2^- 50) ICl_4^-
51) IBr_2^- 52) IF_6^- 53)BrF_3 54) XeF_2 55) XeF_4 56) XeF_6 57) $XeOF_4$ 58) XeO_3

4 Give the products and balance the following equations:

1. $LiH + AlCl_3 \rightarrow$
2. $3\ GaCl \rightarrow$
3. $Al_2O_3 + NaOH + H_2O \rightarrow$
4. 1473K
5. $Al(OH)_3 \rightarrow$
6. $Al + NaOH + H_2O \rightarrow$
7. $Al + HCl + H_2O$
8. $TlOH + HCl \rightarrow$
9. $SiCl_4 + H_2O \rightarrow$
10. $SnCl_4 + H_2O \rightarrow$
11. Sn+ HCl (conc)→
12. Sn+ HCl (g) →
13. $Fe^{3+} + Sn^{2+} \rightarrow$
14. $Pb(NO_3)_2 + HCl \rightarrow$
15. $Pb(NO_3)_2 + KI \rightarrow$
16. $SiO_2 + NaOH \rightarrow$

17. $PbO_2 + HNO_3 \rightarrow$
18. $Sn + O_2 \rightarrow$
19. $Sn + HNO_3 \rightarrow$
20. $SnC_2O_4 \xrightarrow{\Delta}$
21. $PbCO_3 \rightarrow$
22. $PbO + O_2 \rightarrow$
23. $Pb_3O_4 + HNO_3 \rightarrow$
24. $SiF_4 + HF \rightarrow$
25. $Si + 4OH^- \rightarrow$
26. $SiCl_4 + H_2 \rightarrow$
27. $SiHCl_3 + H_2 \rightarrow$
28. $Sn + HCl(conc) \rightarrow$
29. $Sn + H_2SO_4(conc) \rightarrow$
30. $Sn + KOH + H_2O \rightarrow$
31. $SnO + HNO_3 \rightarrow$
32. $Sn + Cl_2(excess) \rightarrow$
33. $PbS + O_2 \rightarrow$
34. $N_2(g) + H_2(g) \rightarrow$
35. $Ca_3P_2 + H_2O \rightarrow$
36. $P_4 + KOH + H_2O \rightarrow$
37. $Zn_3M_2 + HCl \rightarrow$
38. $NaOCl + NH_3 \rightarrow$
39. $P_4 + Cl_2 \dashrightarrow$
40. $P_4 + Cl_2 \dashrightarrow$
41. (Excess)
42. h)$PCl_3 + H_2O \rightarrow$
43. i)$PCl_3 + O_2 \rightarrow$
44. j)$PCl_5 + H_2O \rightarrow$
45. k)$P_4 + O_2 \rightarrow$
46. l)$P_4 + O_2 \rightarrow$ (excess)
47. $P_4O_6 + H_2O \rightarrow$
48. $P_4O_{10} + H_2O \rightarrow$
49. $Bi_2O_3 + HNO_3 \dashrightarrow$
50. $Ca_3(PO_4)_2 + SiO_2 + C \rightarrow$
51. $FeS(s) + H_2SO_4(aq.) \rightarrow$
52. $FeS + H_3O^+ \rightarrow$
53. $S + 3F_2 \xrightarrow{(heat)}$

54. $2S + Cl_2$ (heat) →
55. $Te + 2Cl_2$ (heat) →
56. $Te + 2I_2 \rightarrow TeI_4$
57. $SCl_2 + NaF$ (CH3CN, 350K) →
58. $S + O_2$ →
59. $SO_2(g) + O_2(g)$ →
V_2O_5 720K 2Bar
60. $H_2SO_4 + SO_3$ →
61. $H_2S_2O_7 + H_2O$ →
62. m) $NaCl + H_2SO_4$ →
63. n) $NaNO_3 + H_2SO_4$ →

64. o) $C_{12}H_{22}O_{11}$(Sucrose) → $12C + 11_2O$
con H_2SO_4
65. $C + 2H_2SO_4$ →
66. $Cu + 2H_2SO_4$ →
67. a) $F_2 + X^-$ → [X=Cl, Br, I]
68. b) $Cl_2 + X^-$ → [X=Br, I]
69. $Br_2 + I^-$ →
70. $I_2 + S_2O_3^{2-}$ →
71. $NaCl + H_2SO_4$ →
72. $CaF_2 + H_2SO_4$ →
73. $NaBr + H_3PO_4$ →
74. $KI + H_3PO_4$ →
75. $NaClO_3 + SO_2$ →
76. $Cl_2 + H_2O$ →
77. $I_2 + N_2H_4$ →
78. $I_2 + H_2S$ →
79. $NaClO_3 + SO_2$ →
80. $Cl_2 + H_2O$ →
81. $Cl_2 + HgO + H_2O$ →
82. $NaOH + Cl_2$ →
83. NaOCl →
84. $CaOCl_2 + HCl$ →
85. $Ba(ClO_2)_2 + H_2SO_4$ →
86. NaOCl →
87. $Ba(ClO_3)_2 + H_2SO_4$ →
88. $NaClO_3$ →
89. $Ba(ClO_4)_2 + H_2SO_4$ →
90. $U + ClF_3$ →

91. $MnO_2 + HCl \rightarrow$
92. $KMnO_4 + HCl \rightarrow$
93. $NaBr + Cl_2 \rightarrow$
94. $I^- + Cl_2 \rightarrow$
100. $NaIO_3 + NaHSO_3 \rightarrow$
101. $NaIO_3 + NaI + H_2SO_4 \rightarrow$
102. $IO_3^- + I^- + H^+ \rightarrow$
103. $NaCl + MnO_2 + H_2SO_4 \rightarrow$
104. $Xe(g)_{(Excess)} + F_2(g) \rightarrow$

105. $Xe(g) + 2F_2(g) \xrightarrow{673K/7bar}$ [1:5 ratio]

106 $Xe(g) + 3F_2(g) \xrightarrow{573K/50\text{-}60bar}$ [1:20 ratio]

107 . $XeF_2 + 2H_2O \rightarrow$

108. $XeF_4 + 12H_2O \rightarrow$

109 $XeF_6 + 3H_2O \rightarrow$

110. $XeO_3 + OH^- \rightarrow$

111. $HXeO_4^- + OH^- \rightarrow$

112. $XeF_6 + H_2O \rightarrow$ (partial hydrolysis)

113. $XeF_6 + 2H_2O \rightarrow$ (partial hydrolysis)

114. $XeF_2 + PF_5 \rightarrow$

115. $XeF_4 + SbF_5 \rightarrow$ 116. $XeF_6 + MF \rightarrow$

5. Explain why aluminium though electro positive finds extensive use as a structural material
6 Explain the extraction of Al from bauxite ore with the equations of the reactions involved.
7 Mention four uses of Al.
8. What are silicones? How is it prepared? Mention two uses of silicone.
9. How is a) Si extracted from sand? b) Sn from caseterrite? C) Pb from galena?
10. Give one example each of 2D sheet silicate and 3D framework silicate structure.
11. What are ampiboles? Give one example.
12. What type of cation replaces Al in alums?
13 How is $LiAlH_4$ prepared? Mention its important use
14. How is phosphorus extracted from rock phosphate? Write the equations of the reactions involved. Mention two uses of phosphorus and its compounds
15. Define catenation. Discuss catenation in group 14, 15 and 16.
16. What is allotropy? Discuss about the allotropes of phosphorus and sulphur.

17. How is fluorine obtained from KHF_2?
18 How is chlorine obtained commercially?
19 Write the equations of the reactions involved in the laboratory method of preparation of a) chlorine b) iodine.
20. Write the equations of the reactions involved in the preparation of a) HOCl b) HOClO c) HOClO2 d) HOClO3 e) NH_4ClO_4
21 What are inter halogen compounds? Give two examples.
22. Write the equations of the reactions involved in the preparation of sulphuric acid by contact process. Mention two uses of sulphuric acid.
23. How is H_2S prepared in laboratory? Mention its use in salt analysis.
24. Define catenation. Explain catenation with reference to group 14, 15, and group 16.
25 What is allotropy? Write notes on allotropes of P and S.
26. How will you prepare the following compounds from sulphur a) H_2S b) H_2SO_4 SCl_2 c) SCl_2 d) SF_6
27. With what neutral molecule ClO^- is iso electronic?
28. Give the formula of the noble gas species which is iso structural with a) ICl_4^- b) IBr_2- c) BrO_3^-

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