CHEMISTRY

31. Which of the following minerals classified as an orthosilicate?

1) $Na_4[Si_2O_7]$ 2) $Zn_2[SiO_4]$

3) $Ca_3[Si_3O_9]$ 4) $CaMg[(SiO_3)_2]$

32. The cyclotrimetaphosphoric acid is

1) $H_3P_3O_6$ and contains 12 σ bonds

2) $(HPO_3)_3$ and contains 15 σ bonds

3) $H_3P_3O_9$ and contains 18 σ bonds

4) $(HPO_3)_3$ and contains 9 σ bonds

33. In which of the following S – S link(single or double bond) is present?

I. Marshall's acid II. Dithionic acid

III. Dithinous acid IV. Pyrosulphuric acid

1) only I and IV 2) only II and III

3) only II 4) only I and III

34. The hybridization state of central atoms in the molecules $(SiH_3)_3N$ and $(SiH_3)_3P$ and their shapes respectively are (Near N and P)

1) sp^3 with pyramidal shape in $(SiH_3)_3N$ and sp^3 with pyramidal shape in $(SiH_3)_3P$

2) sp^3 with pyramidal shape in $(SiH_3)_3N$ and sp^2 with planar triangle shape in $(SiH_3)_3P$

3) sp^2 with planar triangle shape in $(SiH_3)_3N$ and sp^3 with pyramidal shape in $(SiH_3)_3P$

4) sp^2 with planar triangle shape in $(SiH_3)_3N$ and sp^2 with planar triangle shape in $(SiH_3)_3P$

35. Which pair of the following halide produces oxoacids of pnicogen on hydrolysis?

1) NF_3, NCl_3 2) $PCl_3, AsCl_3$

3) NCl_3, PCl_3 4) $PCl_3, BiCl_3$

36. Which of the following statement is correct?

1) In pyrosulphurous acid, the oxidation states of both sulphur atoms are not same and these are +4 and +2

2) In the conversion of O_2 to O_3, there is decrease in entropy

3) The conversion of O_2 to O_3 is exothermic

4) The number of sp^2 hybrid atoms of sulphur in the product formed by oxidation of hypo with I_2 is 4

37. Which one of the following has highest decomposition temperature?

1) SiH_4 2) GeH_4 3) CH_4 4) PbH_4

38. The NO molecule

1) is a colourless diamagnetic oxide(gas)

2) is a coloured paramagnetic oxide(gas)

3) often act as a three – electron donor in contrast to most ligands which donates two electrons

4) is a mixed anhydride of HNO_2 and HNO_3

39. In which one of the following all the three oxygen atoms in ozone are completely consumed?

A. SO_2 to SO_3

B. $SnCl_2 + HCl$ to $SnCl_4$

C. Moist iodine to Iodic acid

D. Potassium manganate to potassium permanganate

1) only A and B 2) only C 3) only A and D 4) only B and C

40. In the preparation of HNO_3, we get NO gas by catalytic oxidation of ammonia. The number of moles of NO produced by the oxidation of two moles of NH_3 will be

1) 4 2) 3 3) 2 4) 1

41. Silicon has a strong tendency to form polymers like silicones. The chain length of silicone polymer can be controlled by adding $(Me = -CH_3)$

1) Me_4Si 2) Me_2SiCl_2

3) $MeSiCl_3$ 4) Me_3SiCl

42. On addition of conc H_2SO_4 to a chloride salt colourless fumes are evolved but in case of iodide salt, violet fumes come out. This is because

1) HI changes to HIO_4 2) H_2SO_4 reduces HI to I_2

3) HI gets oxidized to I_2 4) HI is of violet fumes

43. Which of the following statements is incorrect?

1) CCl_4 is immiscible in water, whereas $SiCl_4$ is easily hydrolysed

2) Silicon forms SiF_6^{2-} ion whereas corresponding fluoro compound of carbon is not known

3) PbO_2 acts as a stronger oxidizing agent than SnO_2

4) Graphite has higher thermal conductivity than diamond

44. Oxidation state of selenium in the product(s) formed during the disproportionation of Se_2Cl_2?

1) '+4' and '-2' 2) '+4' and '0' 3) '+6' and '-1' 4) '+6' and '-2'

45. Butter of tin, which is used as a mordant is

1) $SnCl_4.5H_2O$ 2) $SnCl_4.3H_2O$ 3) $SnCl_4.6H_2O$ 4) $SnCl_4.8H_2O$

46. In the silicate mineral $Ca_2Mg_5(Si_4O_{11})_2(OH)_2$, number of oxygen involved in sharing per each tetrahedra are

1) four only

2) one only

3) in half of tetrahedra two and in half of tetrahedra three

4) in half of tetrahedra four and in half of tetrahedra one

47. Which one of the following reactions is correctly given?(all are unbalanced equations)

1) $Zn + \underset{(\text{very dilute})}{HNO_3} \rightarrow NO + Zn(NO_3)_2 + H_2O$

2) $NH_4NO_2 \xrightarrow{\Delta} N_2O + H_2O$

3) $(NH_4)_2Cr_2O_7 \xrightarrow{\Delta} NO_2 + H_2O + Cr_2O_3$

4) $KMnO_4 \xrightarrow{\Delta} K_2MnO_4 + MnO_2 + O_2$

48. Which one of the following is incorrect regarding the halides of chalcogen?

1) Tetrafluorides of S,Se and Te are all gases

2) Tetrahalides have trigonal bipyramidal structures in which one of the equatorial position is occupied by a lone pair of electrons.

3) SF_6 is exceptionally inert

4) All elements except selenium form dichlorides and dibromides.

49. Which one of the following elements has least first ionization enthalpy?

1) Lead 2) Tin 3) Germanium 4) Silicon

50. Oxidation state of sulphur in the product formed when thionyl chloride reacts with white phosphorus?

1) +1 2) +5 3) -2 4) -1

51. $2Pb(NO_3)_2 \xrightarrow{\Delta} 2X + 4Y\uparrow + Z\uparrow$, then

1) Both Y and Z are diamagnetic

2) Both Y and Z are paramagnetic with two unpaired electrons each

3) Y is a mixed anhydride of nitrogen

4) Y is paramagnetic in its solid form also

52. I. Fullerenes are the pure form of carbon because of the absence of dangling bonds

II. C_{60} molecule contain 12 six – membered rings and 20 five – membered rings

III. In C_{60}, all carbon atoms undergo sp^3 hybridization

IV. In C_{60}, a five membered ring is fused with six or five membered rings

Then the incorrect statement(s) is/are:

1) only I 2) only III

3) only II and III 4) only II,III and IV

53. PCl_3 hydrolyses in the presence of moisture gives fumes of HCl and X. X on heating gives Y and PH_3. Then Y is:

1) H_3PO_3 2) H_3PO_4 3) H_3PO_2 4) $H_4P_2O_6$

54. Which one of the following is incorrect regarding Pb_3O_4?

1) It is formed by heating litharge in air at 450^0C

2) It is a scarlet red crystalline substance, insoluble in water

3) With dilute HNO_3 it forms $Pb(NO_3)_2$ and a green coloured precipitate

4) On heating with conc. H_2SO_4 it liberates oxygen gas

55. $4AgNO_3 + 2H_2O + H_3PO_2 \rightarrow 4Ag + 4X + Y$

Then identify the correct statement regarding X and Y?

1) Both are monobasic acids
2) In both X and Y, pnicogens are in +3 oxidation state
3) In both X and Y, pnicogens are in their highest oxidation state
4) X is a tribasic and Y is a monobasic acid

56. A. $SnCl_2$ acts as a reducing agent

B. Tin(II)chloride is linear in shape

C. SnO is prepared by heating stannous oxalate

D. PbI_4 is not known because of the oxidizing power of $Pb(+IV)$ and the reducing power of I^-

Then the incorrect statement is

1) only B 2) only A and C 3) only B and D 4) only C

57. Which of the following statement is incorrect?

1) Solid PCl_5 exists as tetrahedral $[PCl_4]^+$ and octahedral $[PCl_6]^-$ ions

2) Solid PBr_5 exists as $[PBr_5]^+[PBr_6]^-$

3) Solid N_2O_5 exists as $NO_2^+NO_3^-$

4) Oxides of phosphorus P_2O_3 and P_2O_5 exists as dimers

58. Following are formed when tin reacts with conc. HNO_3.

1) $Sn(NO_3)_2 + NH_4NO_3$ 2) $Sn(NO_3)_2 + NO$

3) $Sn(NO_3)_2 + NO_2$ 4) $H_2SnO_3 + NO_2$

59. An inorganic salt (A) on heating produces a colourless and odourless gas (X) which is neutral to litmus. Gas (X) when passed into another vessel containing lime stone and excess of coke at 1273 K produces a well – known fertilizer. Nitrolim. Hence salt (A) may be

1) NH_4NO_3 2) $Ba(N_3)_2$ 3) $LiNO_3$ 4) $Pb(NO_3)_2$

60. $SF_4 + BF_3 \rightarrow (A)$; The compound (A) is

1) $[SF_5][BF_2]^+$ 2) $[SF_3]^+[BF_4]^-$ 3) SF_6 4) S_2F_4