

CHEMISTRY

31. Which of the following minerals classified as an orthosilicate?
- 1) $\text{Na}_4[\text{Si}_2\text{O}_7]$ 2) $\text{Zn}_2[\text{SiO}_4]$
- 3) $\text{Ca}_3[\text{Si}_3\text{O}_9]$ 4) $\text{CaMg}[(\text{SiO}_3)_2]$
32. The cyclotrimetaphosphoric acid is
- 1) $\text{H}_3\text{P}_3\text{O}_6$ and contains 12 σ bonds
- 2) $(\text{HPO}_3)_3$ and contains 15 σ bonds
- 3) $\text{H}_3\text{P}_3\text{O}_9$ and contains 18 σ bonds
- 4) $(\text{HPO}_3)_3$ 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 $(\text{SiH}_3)_3\text{N}$ and $(\text{SiH}_3)_3\text{P}$ and their shapes respectively are (Near N and P)
- 1) sp^3 with pyramidal shape in $(\text{SiH}_3)_3\text{N}$ and sp^3 with pyramidal shape in $(\text{SiH}_3)_3\text{P}$
 - 2) sp^3 with pyramidal shape in $(\text{SiH}_3)_3\text{N}$ and sp^2 with planar triangle shape in $(\text{SiH}_3)_3\text{P}$
 - 3) sp^2 with planar triangle shape in $(\text{SiH}_3)_3\text{N}$ and sp^3 with pyramidal shape in $(\text{SiH}_3)_3\text{P}$
 - 4) sp^2 with planar triangle shape in $(\text{SiH}_3)_3\text{N}$ and sp^2 with planar triangle shape in $(\text{SiH}_3)_3\text{P}$
35. Which pair of the following halide produces oxoacids of pnicogen on hydrolysis?
- | | |
|---------------------------------|----------------------------------|
| 1) $\text{NF}_3, \text{NCl}_3$ | 2) $\text{PCl}_3, \text{AsCl}_3$ |
| 3) $\text{NCl}_3, \text{PCl}_3$ | 4) $\text{PCl}_3, \text{BiCl}_3$ |

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. $\text{SnCl}_2 + \text{HCl}$ 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 ($\text{Me} = -\text{CH}_3$)
- 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) $\text{SnCl}_4 \cdot 5\text{H}_2\text{O}$
 - 2) $\text{SnCl}_4 \cdot 3\text{H}_2\text{O}$
 - 3) $\text{SnCl}_4 \cdot 6\text{H}_2\text{O}$
 - 4) $\text{SnCl}_4 \cdot 8\text{H}_2\text{O}$

46. In the silicate mineral $\text{Ca}_2\text{Mg}_5(\text{Si}_4\text{O}_{11})_2(\text{OH})_2$, number of oxygen involved in sharing per each tetrahedra are

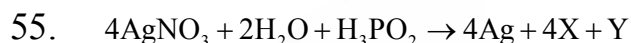
- 1) four only
- 2) one only
- 3) in half of tetrahedra two and in half of tetrahedra three
- 4) in half of tetrahedra four and in half of tetrahedra one

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

- 1) $\text{Zn} + \underset{\text{(very dilute)}}{\text{HNO}_3} \rightarrow \text{NO} + \text{Zn}(\text{NO}_3)_2 + \text{H}_2\text{O}$
- 2) $\text{NH}_4\text{NO}_2 \xrightarrow{\Delta} \text{N}_2\text{O} + \text{H}_2\text{O}$
- 3) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \xrightarrow{\Delta} \text{NO}_2 + \text{H}_2\text{O} + \text{Cr}_2\text{O}_3$
- 4) $\text{KMnO}_4 \xrightarrow{\Delta} \text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2$

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. $2\text{Pb}(\text{NO}_3)_2 \xrightarrow{\Delta} 2\text{X} + 4\text{Y} \uparrow + \text{Z} \uparrow$, 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 $450^\circ C$
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



Then identify the correct statement regarding X and Y?

- 1) Both are monobasic acids
- 2) In both X and Y, pnictogens are in +3 oxidation state
- 3) In both X and Y, pnictogens 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 $\text{Pb}(+IV)$ 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?

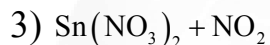
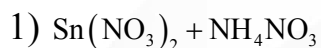
1) Solid PCl_5 exists as tetrahedral $[\text{PCl}_4]^+$ and octahedral $[\text{PCl}_6]^-$ ions

2) Solid PBr_5 exists as $[\text{PBr}_5]^+ [\text{PBr}_6]^-$

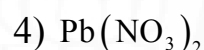
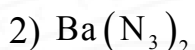
3) Solid N_2O_5 exists as $\text{NO}_2^+ \text{NO}_3^-$

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 .



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



60. $\text{SF}_4 + \text{BF}_3 \rightarrow (\text{A})$; The compound (A) is

