INDIAN SCHOOL MUSCAT

CHEMISTRY IIT -JEE

The p Block elements

1. The inert gas abundantly found in atmosphere is
   a) Ar
   b) Ne
   c) Xe
   d) He
2. Among the following substituted silanes the one which will give rise to cross linked silicone polymer on hydrolysis is
   a) R_4Si
   b) $RSiCl_3$
   c) R_2SiCl_2
   d) R_3SiCl
3. When plants and animals decay, the organic nitrogen is converted into inorganic nitrogen. The inorganic nitrogen is in the form of _____.
   a) Ammonia
   b) Elements of nitrogen
   c) Nitrates
   d) Nitrides

4. Excess of PCl_5 reacts with conc. H_2SO_4 giving
   a) chlorosulphonic acid
   b) thionyl chloride
   c) sulphuryl chloride
   d) sulphurous acid.
5. When Cl_2 gas reacts with hot and concentrated sodium hydroxide solution, the oxidation number of chlorine changes from
   a) Zero to – 1 and zero to +3
   b) Zero to + 1 and zero to –3
   c) Zero to + 1 and zero to –5
   d) Zero to – 1 and zero to +5
6. The correct order of increasing bond angles in the following species is
   a) $Cl_2O < ClO_2 < ClO_2^-$
   b) $ClO_2^- < Cl_2O < ClO_2$
   c) $Cl_2O < ClO_2^- < ClO_2$
   d) $ClO_2 < Cl_2O < ClO_2^-$
7. The tendency of BF_3, BCl_3 and BBr_3 to behave as Lewis acid decreases in the sequence
   a) $BCl_3 > BF_3 > BBr_3$
   b) $BF_3 > BCl_3 > BBr_3$
   c) $BBr_3 > BF_3 > BCl_3$
   d) $BBr_3 > BCl_3 > BF_3$

8. P4O10 is the anhydride of
    a) H_3PO_2
    b) H_3PO_3
    c) H_3PO_4
    d) $H_4P_2O_7$
9. Which of the following statements regarding ozone is not correct?
    a) The oxygen-oxygen bond length in ozone is identical with that of molecular oxygen
    b) The ozone is response hybrid of two structures
    c) The ozone molecule is angular in shape
    d) Ozone is used as a germicide and disinfectant for the purification of air.

10. The reaction of P_4 with X leads selectively to P_4O_6. The X is
    a) Dry O_2
    b) A mixture of O_2 and N_2
    c) Moist O_2
    d) O_2 in the presence of aqueous NaOH

11. Which of the following reactions of xenon compounds is not feasible?

    a) $XeO_3 + 6HF \rightarrow XeF_6 + 3H_2O$
    b) $3XeF_4 + 6H_2O \rightarrow 2Xe + XeO_3 + 12HF + 1.5O_2$
    c) $2XeF_2 + 2H_2O \rightarrow 2Xe + 4HF + O_2$
    d) $XeF_6 + RbF \rightarrow Rb[XeF_7]$

12. In which of the following arrangements, the sequence is **not** strictly according to the property written against it?
    a) $CO_2 < SiO_2 < SnO_2 < PbO_2$: Increasing oxidizing power
    b) HF <HCl<HBr< HI : Increasing acid strength
    c) $NH_3 < PH_3 < AsH_3 < SbH_3$: Increasing basic strength
    d) B < C < O < N : Increasing first ionization enthalpy

13. The brown ring test for nitrates depends on

    a) reduction of ferrous sulphate to iron
    b) oxidation of nitric oxide to nitrogen dioxide
    c) the reduction of nitrate to nitric oxide
    d) oxidising action of sulphuric acid

14. Which is the strongest acid in the following
    a) $HClO_3$
    b) $HClO_4$

c) H_2SO_3
d) H_2SO_4

15. XeF_2 is isostructural with

a) ICl_2^-
b) $SbCl_3$
c) $BaCl_2$
d) TeF_2

16. The pair of species that has the same bond order in the following is:
a) O_2, B_2
b) CO, NO^+
c) NO^-, CN^-
d) O_2, N_2
17. Which blue liquid is obtained on reacting equimolar amounts of two gases at -30°C?
a) N_2O
b) N_2O_3
c) N_2O_4
d) N_2O_5
18. Molecules of a noble gas do not possess vibrational energy because a noble gas _____.
a) is chemically inert
b) is monoatomic
c) is diamagnetic
d) has completely filled shells
19. Sulphur trioxide can be obtained by which of the following reaction

a) $S + H_2SO_4 \xrightarrow{\Delta}$
b) $H_2SO_4 + PCl_3 \xrightarrow{\Delta}$
c) $CaSO_4 + C \xrightarrow{\Delta}$
d) $Fe_2(SO_4)_3 \xrightarrow{\Delta}$

20. The function of $Fe(OH)_3$ in the contact process is
a) To detect colloidal impurity
b) to remove moisture
c) to remove dust particles
d) to remove arsenic impurity
21. Of the following compounds the most acidic is
a) As_2O_3
b) P_2O_5
c) Sb_2O_3
d) Bi_2O

22. Aqueous solution of $Na_2S_2O_3$ on reaction with Cl_2 gives

a) $Na_2S_4O_6$
b) $NaHSO_4$

c) NaCl
d) NaOH

23. The angular shape of ozone molecules (O_3) consists of

a) 2 sigma and 1 pi bonds
b) 1 sigma and 2 pi bonds
c) 2 sigma and 2 pi bonds
d) 1 sigma and 2 pi bonds

24. Helium is used in balloons in place of hydrogen because it is
a) incombustible
b) more abundant than hydrogen
c) radioactive
d) lighter than hydrogen

25. The percentage of p-character in the orbitals forming P - P bonds in P_4 is

a) 25
b) 33
c) 50
d) 75

26. Which is the most thermodynamically stable allotropic form of phosphorus?
a) red
b) white
c) black
d) yellow

27. Among the halogens, the one which is oxidised by nitric acid is

a) Chlorine
b) Bromine
c) Fluorine
d) Iodine

28. Which compound has the maximum number of lone pair of electrons on the central atom?
a) $[ClO_3]^-$
b) XeF_4
c) SF_4
d) $[I_3]^-$

29. Roasting of sulphides gives the gas X as a byproduct This is a colorless gas with choking smell of burnt sulphur and causes great damage to respiratory organs as a result of acid rain. Its aqueous solution is acidic acts as a reducing agent and its acid has never been isolated. The gas X is
a) SO_2
b) CO_2

c) SO_3
d) H_2S

30. Which one of the following is the correct statement?

Boric acid is a protonic acid
Beryllium exhibits coordination number of six
Chlorides of both beryllium and aluminium have bridged chloride structures in solid phase
$B_2H_6.2NH_3$ is known as 'inorganic benzene'

31. The number of hydrogen atom(s) attached to phosphorus atom in hypophosphorous acid is
    a) 0
    b) 2
    c) 1
    d) 3

32. Which of the following is not oxidized by O_3?

    a) KI
    b) $FeSO_4$
    c) $KMnO_4$
    d) K_2MnO_4

33. Which of the following has – O – O – linkage
    a) $H_2S_2O_6$
    b) $H_2S_2O_8$
    c) $H_2S_2O_3$
    d) $H_2S_4O_6$
34. Which one of the following arrangements represents the correct order of least negative to most negative electron gain enthalpy for C, Ca, Al, F and O?
    a) Ca < Al < C < O < F
    b) Al < Ca < O < C < F
    c) Al < O < C < Ca < F
    d) C < F < O < Al < Ca
35. When conc. H_2SO_4 is heated with P_2O_5 , the acid is converted into
    a) sulphur
    b) sulphur dioxide
    c) sulphur trioxide
    d) a mixture of sulphur dioxide and sulphur trioxide

36. The noble gas mixture is cooled in a coconut bulb at 173 K. The gases that are not adsorbed are
    a) He and Ne
    b) Ar and Kr

c) He and Xe
d) Ne and Xe

37. What products are expected from the disproportionation reaction of hypochlorous acid?
    a) $HClO_3$ and Cl_2O
    b) $HClO_2$ and $HClO_4$
    c) HCl and Cl_2O
    d) HCl and HClO

38. Which of the following statements regarding sulphur is incorrect?
    a) The oxidation state of sulphur is never less than +4 in its compounds
    b) S_2 molecule is paramagnetic
    c) The vapour at 200°C consists mostly of S_8 rings
    d) At 600°C the gas mainly consists of S_2 molecules
39. Which one of the following is not true at room temperature and pressure

    a) P_4O_{10} is a white solid
    b) SO_2 is a coloureless gas
    c) SO_3 is a colourless gas
    d) NO_2 is a brown gas
40. Extra pure N_2 can be obtained by heating

    a) NH_3 with CuO
    b) NH_4NO_3
    c) $(NH_4)_2Cr_2O_7$
    d) $Ba(N_3)_2$

41. Choose the incorrect statement about P4O10
    a) All P – O bonds are of equal length
    b) Each P is bonded to four oxygen atoms
    c) Hybridisation of P is sp3
    d) There are six P – O – P linkages
42. Which of the following statements is **correct**?
    (1) Bond order of NO□ □ is 2.5
    (2) NO is diamagnetic in nature
    (3) The structure of NO is N O.,each atom having
    zero formal charge
    (4) NO is an acidic oxide in aqueous medium
43. What is formed when xenon combines with fluorine in the presence of mercury vapour?
    a) XeF
    b) Xe_2F
    c) XeF2
    d) XeF4
44. What are the products formed in the reaction of xenon
    hexafluoride with silica?

a) $XeSiO4 + HF$
b) $XeF2 + SiF4$
c) $XeOF4 + SiF4$
d) $XeO3 + SiF4$

45. Which of the following compounds is explosive?
    a) XeF2
    b) XeF4
    c) Xe03
    d) XeF3
46. The noble gas which shows abnormal behaviour in liquid state and behaves as a superfluid is:
    a) neon
    b) helium
    c) argon
    d) xenon.
47. A greenish yellow gas reacts with an alkali metal hydroxide to form a halate which can be used in fIreworks and safety matches. The gas and the halate are
    a) Br_2,$KBrO_3$
    b) CI_2,$KCIO_3$
    c) 1_2, $NalO_3$
    d) 1_2, KIO_3

48. Chlorine water on cooling deposits greenish-yellow crystals of:
    a) Cl_2,$2H_2O$
    b) Cl_2,H_2O
    c) Cl_2,$3H_2O$
    d) Cl_2,$8H_2O$

49. Bleaching powder is an example of:

    a) An acidic salt
    b) A complex salt
    c) A mixed salt
    d) A double salt
50. Which has maximum pH in aqueous solution ?
    a) NaClO
    b) $NaClO_2$
    c) $NaClO_3$
    d) $NaClO_4$