The p-Block Elements : Boron Family

Q.1. The type of hybridization of boron in diborane is

a) sp
b) sp^2
c) sp^3
d) sp^3d

Q.2. Which of the following hydroxide is acidic ?

a) $Al(OH)_3$
b) $B(OH)_3$
c) $Ga(OH)_3$
d) $Ca(OH)_2$

Q.3. In diborane

a) 4–bridged hydrogens and two terminal hydrogens are present
b) 2– bridged hydrogens and four terminal hydrogens are present
c) 3–bridged and three terminal hydrogens are present
d) None of these

Q.4. In reaction: $BF_3 + 3LiBH_4 \rightarrow 3LiF + X$; X is

a) B_4H_{10}
b) B_2H_6
c) BH_3
d) B_3H_8

Q.5. Which of the following does not give a borax bead test ?

a) Chromium salt
b) Ferrous salt
c) Sodium salt
d) Cobalt salt

Q.6. The bonds present in borazole or inorganic benzene are

a) 9 σ, 6π
b) 12 σ, 3π
c) 6σ, 9π
d) 15σ only

Q.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) $BBr_3 > BCl_3 > BF_3$

Q.8. Aluminium is extracted from alumina (Al_2O_3) by electrolysis of a molten mixture of :

a) Al_2O_3+ HF + $NaAlF_4$
b) Al_2O_3+ CaF_2+ $NaAlF_4$
c) Al_2O_3+ Na_3AlF_6+ CaF_2
d) Al_2O_3+ KF + Na_3AlF_6

Q.9.Orthoboric acid when heated to red hot gives

a) metaboric acid
b) pyroboric acid
c) boron and water
d) boric anhydride

Q.10. Which one of the following is the correct statement?

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

Q.11. Which of the following element primarily shows a +1 oxidation state?

a) Boron
b) Aluminium
c) Thallium
d) None of the above

Q.12. Which of the following is the hardest compound of boron?

a) Boron carbide
b) Boron fluoride
c) Boron nitride
d) None of the above

Q.13.The precious Ruby stone is

a) alumina
b) aluminium silicate
c) sodium aluminium silicate
d) sodium silicate

Q.14.The purification method used for mineral $Al_2O_3.2H_2O$ is

a) froth floatation
b) leaching
c) liquation
d) magnetic separation

Q.15.Which statement regarding H_3BO_3 is not correct ?

a) It is a strong tribasic acid
b) It is prepared by acidifying an aqueous solution of borax
c) It has a layer structure in which planar BO_3 units are joined by H^- bonds
d) It does not act as proton donor but acts on lewis acid by accepting OH^- ions

Q.16.The hybridisation of boron atom in orthoboric acid is

a) sp
b) sp^2
c) sp^3
d) sp^3d

Q.17.Anodised aluminium is

a) Al obtained at anode
b) Al prepared electrolytically
c) Alloy of Al containing 95% of Al
d) Al electrolytially coated with aluminium oxide

Q.18.Which of the following structure is similar to graphite?

a) B
b) BN
c) B_4C
d) B_2H_6

Q.19.Al_2O_3 can be converted to anhydrous $AlCl_3$ by heating

a) Al_2O_3 with NaCl in solid state
b) a mixture of Al_2O_3 and carbon in dry Cl_2 gas
c) Al_2O_3 with Cl2 gas
d) Al_2O_3 with HCl gas

Q.20.The highly toxic element of group 13 is

a) Al
b) B
c) Ga
d) Tl

Q.21.The IE_1 among the group 13 member follows as

a) B > Al < Ga < Tl
b) B > Al > Ga > Tl
c) B > Ga > Al > Tl
d) B > Ga < Al < Tl

Q.22.Corundum is

a) $Al_2(SO_4)_3$
b) $Al_2O_3.H_2O$
c) $Al_2O_3.2H_2O$
d) Al_2O_3

Q.23.Diborane upon hydrolysis gives

a) boric anhydride
b) metaboric acid
c) orthoboric acid
d) boron oxide

Q.24.BCl_3 does not exist as dimer but BH_3 exists as dimer (B_2H_6) because

a) chlorine is more electronegative than hydrogen
b) there is pp-pp back bonding in BCl3 but BH3 does not contain such multiple bonding
c) large sized chlorine atoms do not fit in between the small boron atoms where as small sized hydrogen atoms get fitted in between boron atoms
d) None of these

Q.25.In aluminates, the coordination number of Al is

a) 4
b) 6
c) 3
d) 1