**ALVA’S PRE - UNIVERSITY COLLEGE, MOODBIDRI.**

**CHEMISTRY**

**p-BLOCK- group (**13,14,15)-C09 **- by DH**

1. The aqueous solution of borax is

1) acidic 2) neutral 3) amphoteric 4) alkaline

Ans. 4

1. Specify the coordination geometry around the hybridisation of N and B atoms in a 1:1 complex of BF3 and NH3

1) N : tetrahedral, sp3 ; B : tetrahedral, sp3 2) N : pyramidal, sp3 ; B : pyramidal, sp3

3) N : pyramidal, sp3 ; B : planar, sp3 4) N : pyramidal, sp3 ; B : tetrahedral, sp3

Ans.1

1. The least acidic in the series of BF3, BCl3 and BBr3 is BF3 because

1) F is most electronegative 2) F has a small size

3) B3+ has a very small size 4) back donation of electrons from F to B occur

Ans. 4

1. Al and Ga have nearly the same covalent radii because of:

1) greater shielding effect of s electrons of Ga atoms

2) poor shielding effect of s electrons of Ga atoms

3) poor shielding effect of d electrons of Ga atoms

4) greater shielding effect of d electrons of Ga atoms

Ans. 4

1. Boric acid H3BO3 and BF3 have the same number of electrons,

The former is a solid and the latter is a gas. The reason is:

1) BF3 is a Lewis acid while B(OH)3 is not

2) They have different geometries

3) In BF3, F  ̶  is smaller in size than OH ̶ in B(OH)3

4) No molecular association is possible in BF3 but possible in B(OH)3 due to hydrogen bonding

Ans. 4

1. On the addition of mineral acid to an aqueous solution of borax, the following compound is formed:

1) boron hydride 2) orthoboric acid 3) metaboric acid 4) pyroboric acid

Ans. 2

1. The liquified metal expanding on solidification is

1) Al 2) Ga 3) Zn 4) Cu

Ans. 2

1. H3BO3 X Y B2O3 ;

X and Y respectively are

1) X = Metaboric acid ; Y= Tetraboric acid 2) X = Borax; Y = Metaboric acid

3) X = Tetraboric acid; Y= Metaboric acid 4) X = Tetraboric acid ; Y = Borax

Ans. 1

1. In B2H6

1) there is direct boron-boron bond 2) the boron atoms are linked through hydrogen bridges

3) the structure is similar to C2H6 4) all the atoms are in one plane

Ans. 2

1. The stability of +1 oxidation state increases in the sequence:

1) Tl<In<Ga<Al 2) In<Tl<Ga<Al 3) Ga<In<Al<Tl 4) Al<Ga<In<Tl

Ans 4,

1. Borazole, B3N3H6 is related to benzene as:

1) isoelectronic 2) isostructural 3) both (a) and (b) 4) none of these

Ans. 2

1. Borax is converted into crystalline boron by the following steps:

Borax H3BO3 B2O3 B, X and Y are respectively

1)HCl, Mg 2)HCl, C 3)C , Al 4)HCl, Al

Ans. 4, X=HCl, Y=Al

1. Which of the following is formed when Al2O3 and C is strongly heated in dry Cl2 gas

1)AlCl3 2)hydrated AlCl3 3) anhyd AlCl3 4)none

Ans.3

1. Aluminium hydroxide is soluble in excess of NaOH forming the ion

1)Be(OH)2 2)AlO2 3- 3)AlO2 - 4)AlO3 -

Ans. 3

1. In commercial electrochemical process for extraction of aluminium, the electrolyte used is

1)Al(OH)3 in NaOH solution 2)Aq. Solution of Al2(SO4)3

3)molten mixture of Al2O3 and Na3AlF6 4) molten mixture of AlO(OH) and AL(OH)3

Ans. 3, Hall herault process

1. Identify the incorrect statement:

1) Crystalline silicon is prepared from SiCl4

2) Amorphous silicon is chemically more active than crystalline form

3) SiCl4 is readily hydrolysed

4) Silicon hydrides are known as silicones

Ans. 4

1. Graphite is a good conductor of electricity because it contains:

1) bonded electrons 2) mobile electrons 3) strong C-C bonds 4) strong C=C bonds

Ans. 2

1. Which of the following is not hydrolysed?

1) CCl4 2) SiCl4 3) SnCl4 4) PbCl4

Ans. 1

1. A metal M forms chlorides in its + 2 and + 4 oxidation states. Which of the following statements

about these chlorides is correct?

1) MCl2 is more ionic than MCl4

2) MCl2 is more easily hydrolysed than MCl4

3) MCl2 is more volatile than MCl4

4) MCl2 is more soluble in anhydrous ethanol than MCl4

Ans. 1

1. CO2 is gas while SiO2 is solid. This is because

1) Si - O bond possesses considerable ionic nature due to large electronegativity difference

between Si and O atoms while C ̶ O bonds are covalent in nature

2) CO2 is linear while SiO2 has three dimensional infinite structures

3) size of C is less than that of Si

4) carbon has no d-orbitals while Si has

Ans.1

1. Which statement is correct with respect to the property of the elements with increase in atomic number in the carbon family?

1) Their metallic character decreases 2) The stability of +2 oxidation state increases

3) Their ionization energy increases 4) Their atomic size decreases

Ans. 2

1. Which is not an allotrope of carbon?

1) Graphite 2) diamond 3) Soot 4) carborundum

Ans. 4

1. Name the structure of silicate in which three oxygen atoms of [SiO4]4- are shared

1) pyrosilicate 2) sheet silicate

3) linear chain silicate 4) three dimensional sheet silicate

Ans. 2

1. Which one of the following anions is present in chain structure silicates

1)Si2O7 6- 2)(Si2O5 2-)n 3)Si2O6 2-)n 4)SiO4 4-

Ans 3,

1. Which one the following statement about zeolite is false

1)they are used as cation exchanger

2)they are open structures take up small molecules

3)none of the SiO4 4- are replaced by AlO4 5- ions

4)they are 3D aluminosilicates

Ans.3 due to this they have Si-O-Al network

1. Si have strong tendency to form silicone polymers. The chain length of these polymers can be controlled by adding

1)MeSiCl3 2)Me2SiCl2 3)Me3SiCl 4)Me4Si

Ans.3

1. Which of the following is similar to graphite

1)B 2)BN 3)B2H6 4)B4C

Ans.2, boron nitride

1. The correct order of increasing C-O bond length of CO, CO2 and CO3 2- is

1) CO3 2-  < CO2 < CO 2) CO2 < CO3 2-  < CO 3) CO < CO3 2-  < CO2 4) CO< CO2 < CO3 2-

Ans.4, triple bond, double bond, partial double bond

1. PbF4, PbCl3 exist but PbBr4 and PbI4 does not exist as

1)large size of Br- and I- 2)strong oxidizing character of Pb 4+

3) strong reducing character of Pb 4+ 4)low electronegativity of Br- and I-

Ans. 2, oxidizing nature of Pb4+ , Br- and I- cannot exist,, F and Cl are more oxidizing

1. Which one of the following combines with Fe (II) ions to forcan achieve m a brown complex ?

1) NO 2) N2O 3) N2O3 4) N2O5

Ans : 1) Explanation : [Fe(H2O)6 ]2+ + NO [Fe(H2O)5(NO)] 2+ + H2O

Brown complex

1. Extra pure N2 can be obtained by heating

1) NH3 and CuO 2) NH4NO3 3)(NH4)2Cr2O7  4)Ba(N3)2

Ans : 4) Explanation : ; Ba(N3)2 Ba + 3 N2

1. Which one of the following nitrogen oxides is an anhydride of nitric acid

1)N2O5 2) N2O4 3) N2O3 4) N2O

Ans : 1) N2O5 is the anhydride of nitric acid as it gives HNO3 on adding water

N2O5 + H2O → 2HNO3

1. P4 O10 has short and long P-O bonds. The number of short P=O bonds in this compound is

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

Ans : 4) In P4O10, there are four shorter P= O bonds and six longer P-O-P bonds

1. The oxidizing property of nitric acid is due to

1)Its concentration 2)The positive valency of N

3) Its dilution 4) Presence of nitrogen in its higher oxidation state

Ans : 4) Explanation : HNO3 has nitrogen in its highest oxidation ie, +5 state, due to this it reduces itself by oxidizing other substances, hence is very strong oxidizing agent

1. The equivalent weight of phosphoric acid (H3PO4) in the reaction

NaOH + H3PO4 → NaH2PO4 + H2O is

1)25 2) 49 3) 59 4) 98

Ans: 4) Explanation : NaOH + H3PO4 → NaH2PO4 + H2O

In this reaction H3PO4 releases only one H+ and behaves as monobasic acid.

Thus, Eq. weight = Mol. Weight = (3 X 1) + 31 + (4 X 16) = 98

1. Which of the following acids forms three series of salts?

1)H3PO2 2) H3BO3 3) H3PO4 4) H3 PO3

Ans : 3) Explanation : H3PO4 has three OH groups, ie, has three ionizable H- atoms and hence forms three series of salts

1. The molecule having smallest bond angle is

1)AsCl3 2) SbCl3 3) PCl3 4) NCl3

Ans: 2) Explanation : SbCl3 has the lowest bond angle because amongst N, P, As and Sb , Sb has the lowest electronegativity

1. Which of the following is not shown by NO

1)its bond order is 2.5 2)it is diamagnetic in gaseous state

3)it is neutral oxide 4)it combines with O2 to form NO2

Ans. 2, it is paramagnetic

1. Which of following is incorrect about white and red phosphorous

1)they are both souble in CS2 2)they can be oxidized by heating in air

3)they consist of same kind of atoms 4)they can be converted into one another

Ans. 1,only white is soluble not red

1. A metal X on heating in nitrogen gas gives Y, Y on treatment with H2O gives a colourless gas which when passed through CuSO4 solution gives a blue colour. Y is

1)Mg(NO3)2 2)Mg3N2 3)NH3 4)MgO

Ans. 2 3Mg + N2→Mg3N2→Mg(OH)2 +NH3,, CuSO4 + 4NH3→[Cu(NH3)4]SO4

1. Consider the following sequence of reaction .

Na +NH3→X Y Z (pure gas), identify the gas Z

1)N2 2)NH3 3)O2 4)H2

Ans. 1, X=NaNH2, Y= NaN3, Z= N2

1. Phosphine is not obtained by which of the following

1)white P heated with NaOH 2)red P heated with NaOH

3)Ca3P2 reacts with water 4)P2O3 boiled with water

Ans. 2, red P does not react

1. Conc HNO3 is heated with P2O5 to form

1)NO2 2)NO 3)N2O5 4)N2O

Ans..3, gives N2O5 +HPO3

1. The number of P - OH bonds and the oxidation state of P atom in H4P2O7 are

1)4,4 2)5,4 3)5,5 4)4,5

Ans.4,

1. The element that forms oxides in all oxidation states from +1 to +5 is
2. N 2) P 3) As 4) Sb

Ans. 1