Time: 1 hrs Max marks = 20

Section – 1 (1 marks each)

1. State Hess's Law of constant heat summation.
2. Explain why AlF_6^{3-} exist but BF_6^{3-} does not.
3. Calculate the number of sigma & pi bond in the following compound.
4. Lead (IV) chloride is highly unstable towards heat. Comment

Section – 2 (2 marks each)

6. Define Cp–Cv = R

   When 2 moles C_2H_6 (g) undergoes combustion, 3129 KJ of heat is liberated. Calculate heat of formation of C_2H_6(g).

7. The equilibrium constant for a reaction is 10. What will be the value of ΔG^o? R = 8.314 JK^{-1} mol^{-1}, T = 300 K.
8. Calculate the energy change on freezing of 1.0 mol of water at 10.0°C to ice at – 10.0°C. $\Delta_{fus}h$ = 6.03 kJ mol^{-1} at 0°C.

   $Cp[H_2O(l)]$ = 75.3 J mol^{-1} K^{-1}

   $Cp[H_2O(s)]$ = 36.8 J mol^{-1} K^{-1}

9. (a) What are silicones?

   (b) What happens when silicon is heated with methyl chloride at high temperature in presence of copper?

Section – 3 (4 marks each)

10. Depict a galvanic cell which the reaction $Cu^{+2}(aq)+Ni(s) \rightarrow Ni^{+2}(aq) + Cu(s)$, takes place Further show that..

    a) Which electrode acts as anode

    b) the carriers of current in the cell

    c) Individual reaction at each electrode.

    d) Calculate E^o cell given:- E^oNi^{+2}/Ni = – 0.25V and E^oCu^{+2}/Cu = 0.34V.

12. a) $SiCl_4$ gets easily hydrolyzed but CCl_4 does not.

b) What happens when boric acid is heated?

c) Ga has higher I.E. than Al.

d) Explain the structure and bonding in diborane.