(b) (i) Define magnetic induction, relative permeability and magnetic susceptibility. How they are interrelated? 5

(ii) What is spin crossover? Explain with an example of iron(II) complex. 3

(c) (i) What is Bohr magneton? Calculate it. (ii) Describe Super exchange phenomena. (iii) μ_{exp} is higher than μ_s value for Td. Ni(II)- and Oct. Co(II) complex. Explain. (2+2+4)

(d)What do you mean by metal cluster? Write two examples of Π accepter clusters with detail structure. Write the structure of a metal cluster having square planar geometry. (2+4+2)

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Internal Assessment-10

2023

M.Sc.

4th Semester Examination

CHEMISTRY

PAPER – CEM-402 (Inorganic Special)

Full Marks : 50

Time : 2 Hours

(CEM 402-Advanced Inorganic Chemistry-I)

1. Answer any ***four*** bits: 2×4 = 8

(a) Write an example of each of four metal and five metal clusters.

(b) Write notes on 'Interstitial carbide'.

(c) $IsCu(OAc)_2.H_2O$ diamagnetic? Explain your answer.

(d) What do you mean by naked cluster? Give an example.

(e) Draw the structures of the compounds using polyhedral skeletal electron counting (i) $[Rh_6(CO)_{16}]$ and (ii) Pb_7^{4-}.

(f)What do you mean by spin state equilibrium?

2. Answer any ***four*** bits: 4×4 = 16

(a) Draw and explain the structure of $[Re_2Cl_8]^{2-}$.

(b) $K_3[CoF_6]$ is paramagnetic while $K_2[NiF_6]$is diamagnetic. Explain.

(c) Write the structures of $[CpWIr_3(CO)_{11}]$ and $[Re_4(CO)_{16}]^{2-}$

(d) Calculate the magnetic moments of Tb^{3+} and Dy^{3+}.

(e) Write two major importance of metal clusters. Write two examples of Π donor clusters.

(f) What do you mean by 'magnetic flux' and 'magnetic permeability'?

3. Answer any ***two*** questions 2×8 = 16

(a) (i) Briefly describe the temperature effect (above and below of Curie temperature) on ferromagnetic materials with the help of Weiss Theory. 3

(ii) Calculate the magnetic moment (saturated) in all oxidation state of Fe, Co and Ni systems (H.S and L.S). 5

(b) (i) Define magnetic induction, relative permeability and magnetic susceptibility. How they are interrelated? 5

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