BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MSC **SEMESTER : I**
BRANCH: CHEMISTRY **SESSION : MO/19**

SUBJECT: CH401 BASIC INORGANIC CHEMISTRY

TIME: 3:00 HOURS **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Define equivalent and non-equivalent hybrid orbital and discuss δ bonding with example. [5]
Q.1(b) Discuss Walsh's rule and draw the M.O diagrame for H_2O molecule accordingly. [5]

Q.2(a) For an octahedral crystal field obtain the potential at any point. [5]
Q.2(b) Schemetically represent and explain tetragonal distortion in octahedral geometry. [5]

Q.3(a) Show the steps in SN^1CB mechanism in octahedral Co(III) complexes and discuss that the large difference between the rate data of acid hydrolysis and base hydrolysis of $[Co(NH_3)_5Cl]^{2+}$ can only explained by SN1CB mechanism. Explain. [5]
Q.3(b) What is trans effect? Discuss trans effect by polarization theory. [5]

Q.4(a) Draw the energy level diagram for the microstates of carbon. [5]
Q.4(b) Discuss the relaxation processes for the Laporte Selection Rule. [5]

Q.5(a) With suitable example, discuss Holohedrized symmetry in an octahedral environment. [5]
Q.5(b) V^{+3} shows lesser number of ligand field bands in the experimental spectrum. How the 3rd band can be predicted theoretically. [5]

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