B.Sc. (Honours) Examination, 2017

Semester-VI

Chemistry (Honours)

Course: BCHC-61

(Inorganic Chemistry)

Time: Three Hours **Full Marks: 30**

Questions are of value as indicated in the margin.

Answer ***any three*** questions.

1. a) Show, how does the energies of the metal ion 'd' orbitals will be affected by the set of surrounding ligands in (i) O_h, (ii) Tetragonal, (iii) Square planar geometry. 6
   b) What is the difference between t_{2g} / eg and T_{2g} / Eg. 2
   c) Crystal field energy gap for tetrahedral geometry is half(approx.) to that of O_h geometry – Explain. 2

2. a) What is CFSE? Give its role in geometrical preference. 2+2
   b) $[NiCl_4]^{2-}$ is paramagnetic but $[Ni(CN)_4]^{2-}$ is diamagnetic – Explain in terms of CFT. 4
   e) Why the tetrahedral complexes usually not low spin? 2

3. a) "The uses of hydrohaloalkanes are recommended over CFCs" – Justify the statement. 3
   b) What is photochemical smog? 3
   c) Write a brief note on "green house gases". 4

4. a) What is organometallic compound? Give an example of naturally occurring organometallic compound. 2
   b) What is 18 electron rule? Give its demerit(s). 2
   c) Write IUPAC name of Zeise's salt. Mention the structural features of Zeise's salt and explain it in terms of light bonding theory. 4
   d) Differentiate between linear and bent nitrosyls. 2

5. a) What is isolobal analogy? Which organic compound is isolobal to $Ir_4(CO)_{12}$? 2
   b) Differentiate between Fisher Carbene and Schorck Carbene. 2
   c) Write the IUPAC name of the following:
      (i) $Na_4[Fe(CN)_5(NO)]$ (ii) $Fe_2(CO)_9$. 2
   d) The compound $TiCp_4$ shows four, two and one proton NMR peaks at –82, –27 and 62°C temperature respectively – Explain. 4

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