RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

FIRST YEAR [2015-18]

B.A./B.Sc. FIRST SEMESTER (July – December) 2015

Mid-Semester Examination, September 2015

Date : 15/09/2015 **CHEMISTRY (General)**

Time : 12 noon – 1 pm Paper : I Full Marks : 25

[Answer <u>five questions</u> taking minimum <u>two questions</u> from each group]

Group – A

1. a) Write down the difference between a double salt, perfect complex and imperfect complex with suitable examples. [3]
   b) Why is transition metals form complex compounds? Explain. [2]

2. a) What do you mean by primary valency and secondary valency of a transition metal? Explain with examples. [2·5]
   b) What is chelating ligand? (cite with an example) All bidentate ligands are not chelating ligands. Comment on. [2·5]

3. a) Write the IUPAC names of the following two complex compounds.
   (i) $Ni(DMG)_2$ (ii) $K[PtCl_3(NH_3)]$ [2]
   b) Define bond moment and one pair moment with examples. [3]

4. a) Carbon dioxide has zero dipole moment. Explain. [2]
   b) Write the state of hybridisation and geometry of the following molecules taking consideration of electron pair, bond pair and lone pair. [3]

Group – B

5. What is the basis of Pauling's electronegativity? Calculate the Pauling electronegativity of Chlorine from the following data : bond energies (KCal/mole) for H_2(104), Cl_2 (57), HCl (102), electronegativity of hydrogen = 2·1. [2+3]

6. a) Explain the following electron affinity value (Kj mol^{-1}) : [2]
   F(327·9), Cl (348·3), Br(324·2), I(295·3)
   b) Successive electron affinities have negative value. Explain. Electron affinity of noble gases are actually negative. Comment. [3]

7. a) Define with example, atomic and ionic radii. [1+1]
   b) Give IUPAC name of the element having atomic number (z) = 104 and 107. [1+1]
   c) Arrange the following ions, in increasing order of their ionic radii, H^-, Cl^-, Br^-, F^-, I^-. [1]

8. a) Calculate the ground state energy of the $1s^1$ electron and the radius of the first Bohr orbit of hydrogen atom. [2+2]
   b) Mention the merits of Bohr model. [1]

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