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

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

SUBJECT: CH103 INORGANIC CHEMISTRY-I

TIME: 3 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) Discuss the physical significance of wave function. What is radial probability distribution functions? Draw radial probability distribution function for 2s orbital. [5]

Q.1(b) Draw the shapes of five d orbitals. The mass of electron is 9.1× 10-31 KG. If its kinetic energy is 3.0× 10-25 J, calculate its wavelength. [5]

Q.2(a) Discuss Slater's rule. Calculate the Z_{eff} for (i) Ni (ii) Zn (iii) F [5]

Q.2(b) Write the Mulliken scale of electronegativity. Discuss the Mulliken –Jaffee electronegativity concept. [5]

Q.3(a) Deduce the Born-Lande equation to estimate the lattice energy. [5]

Q.3(b) Discuss the effect of hydrogen bonding on solubility of compound with example and explain the different H_2O molecules in $CuSO_4$, $5H_2O$. [5]

Q.4(a) Predict the structure : (i) ClF_3 and NH_3 by VSEPR theory, (ii) H_2O, C_2H_4 and CO_3^{2-} by hybridization. [5]

Q.4(b) What is dipole moment? Calculate the percent ionic character of HF having bond distance 0.92A and dipole moment 1.78D. [5]

Q.5(a) Discuss the role of Zimmermann-Reinhardt solution in estimation of iron permanganometrically in HCl medium. [5]

Q.5(b) Balance the following redox reactions: [5]

(i) Oxidation of Fe^{2+} by $KMnO_4$ by Ion Electron Method

(ii) Oxidation of iodide ion by dichromate ion in acid medium by oxidation number method

:::::04/12/2019:::::E