

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

CLASS: IMSC
BRANCH: CHEMISTRY

SEMESTER : I
SESSION : MO/18

SUBJECT: CH103 INORGANIC CHEMISTRY-I

TIME: 3:00 HRS.

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) Write the postulates and explain Sommerfeld treatment of atomic model. [5]
Q.1(b) By Hiesenberg Uncertainty Principle prove proton is a nuclear particle, but electron can't exist in nucleus. [5]
- Q.2(a) What do you mean by effective nuclear charge? [3]
Calculate the Z_{eff} for (i) Ni (ii) Mn (iii) Sr (iii) F
- Q.2(b) Discuss the Alfred-Rochow electronegativity. [3]
Q.2(c) Arrange the following with reason [4]
(i) The increasing order of effective nuclear charge in Na,Al, Mg and Si atoms
(ii) The increasing order of van der Waal's radii of O, N, Cl, F and Ne
(iii) The increasing first ionization enthalpy for Ca, Ba, S, Se and Ar
(iv) The decreasing size of K^+ , Ca^{2+} , Cl^- , S^{2-}
- Q.3(a) Deduce the Born-Lande equation to estimate the lattice energy. What is zero point energy? [5]
Q.3(b) Discuss the effect of hydrogen bonding on solubility, molar entropy change of vaporization, azeotropic behavior. [5]
- Q.4(a) Molecular Orbital diagrams for all the 2nd period elements are not same - Explain with suitable MO diagram. [5]
Q.4(b) In ^{19}F nmr spectroscopy Fluorine atoms of $MePF_4$ are indistinguishable but in Me_2PF_3 , fluorine atoms can be differentiated. [5]
- Q.5(a) Derive Nernst equation for a redox reaction. [5]
Q.5(b) By Ion Electron Method balance the following redox reactions: [5]
i) Oxidation of Mn^{+2} by BiO_3^- in acid medium
ii) Oxidation of SnO_2^{-2} by Bi^{+3} in alkaline medium

:::::10/12/2018:::::M