

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

CLASS: IMSc
BRANCH: CHEMISTRY

SEMESTER: V
SESSION : MO/2019

SUBJECT : IMC5007 INORGANIC CHEMISTRY - I

TIME: 1.5 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

-
- Q1 (a) Calculate and identify all the individual orbitals for $n=2$ & $n=3$. [2]
(b) Derive Schrodinger wave equation. [3]
- Q2 (a) Draw the radial distribution curve for $n=3$, $l=0,1,2$. [2]
(b) Define effective nuclear charge. Calculate Z_{eff} experienced by ; [3]
(i) 5s electron (ii) 4d electron in Ag atom ($Z=47$)
- Q3 (a) Show the possible orientation of spin vector of single electron [2]
(b) Differentiate between R-S coupling & j-j coupling. Give the Hund's rule in context to [3]
ground state term symbol.
- Q4 (a) Define microstate. Calculate the no. of microstate in the following configuration; [2]
(i) d^1 (ii) p^3
(b) Give the ground state term symbol for d^9 , d^4 and d^8 configuration. (show the calculation) [3]
- Q5 (a) Discuss the variable Oxidation state of 3d series. [2]
(b) Discuss the catalytic property of d-block elements with examples. [3]
- Q6 (a) Explain exchange energy. [2]
(b) Calculate in Bohr magneton the expected magnetic moment for the following ions (spin [3]
magnetic moment):
(i) Fe^{+3} (ii) Ni^{+2} (iii) Cu^+

:::::: 24/09/2019 :::::E