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

CLASS: IMSC **SEMESTER : vi**
BRANCH: CHEMISTRY **SESSION : SP/19**

SUBJECT: IMC6007 INORGANIC CHEMISTRY III

TIME: 3 Hours **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
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 extraction of lanthanides using monazite sand. What are the different techniques employed for the same? [6]
Q.1(b) Explain lanthanide contraction and its effect on various properties of elements. [6]

Q.2(a) What is radioactivity? Discuss how yield of heavier elements is controlled in preparation of actinides. [6]
Q.2(b) What is nuclear fission? How a chain reaction is controlled in a nuclear reactor? [6]

Q.3(a) What is magnetic susceptibility and effect of temperature on it? Describe any one method for its measurement. [6]
Q.3(b) Explain splitting of d orbitals in octahedral and tetrahedral systems and resultant effect on magnetic properties and stereochemistry of complexes. [6]

Q.4(a) What is valence bond and crystal field interpretation of magnetic moment? Explain with suitable examples? [6]
Q.4(b) What are drawbacks of crystal field theory? [6]

Q.5(a) Why do d^8 ions of Co(I), Rh(I) and Ir(I) acquire 16 electron square planar configuration? [6]
Q.5(b) Discuss the mechanism of α and ß hydride transfer for decomposition reaction of transition metal alkyls. [6]

Q.6(a) Discuss the mechanism of insertion of CO into metal carbon bond of transition metal alkyls. [6]
Q.6(b) Discuss the structure and bonding in Ferrocene molecule and give its MO diagram. [6]

Q.7(a) What are Biological oxygen carriers? Explain the mechanism and chemistry involved in this transport. [6]
Q.7(b) Explain the structure and function of heamoglobin and its significance. [6]

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