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

CLASS: M.SC **SEMESTER : II**
BRANCH: CHEMISTRY **SESSION : SP/19**

SUBJECT: CH408 ADVANCED INORGANIC CHEMISTRY

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) Explain magnetic moment and magnetic susceptibility. How they are correlated? Give the possible orientation of orbital vector for d-electron (l=2). [5]

Q.1(b) What are Pascal's constant and consecutive corrections and what use we can put them to? Explain hole equivalency theorem and mention two instances where this theorem comes to our aid. [5]

Q.2(a) Describe an experimental set up for measuring the magnetic susceptibility by NMR method. Discuss advantages and disadvantages of Guoy's, Farady and NMR methods. [5]

Q.2(b) Explain with the help of diagram the splitting of orbital's in V^{+3} ion under the influence of magnetic field. [5]

Q.3(a) Differentiate between ferromagnetism and anti-ferromagnetism. Draw hysteresis loop and explain. [5]

Q.3(b) How does temperature independent paramagnetism arise? Can it arise in the absence of magnetic field? Discuss the magnetic properties of actinide ions and give a comparison of the magnetic properties of actinide ions and the lanthanide ions. [5]

Q.4(a) What are low nuclearity and high nuclearity carbonyl clusters? Taking suitable example, discuss the structure and bonding in low nuclearity and high nuclearity carbonyl clusters. [5]

Q.4(b) What are boranes? Give two methods of preparation and also discuss hydrogen bridged structure of B_2H_6. [5]

Q.5(a) Draw the structure of following Phosphorus cage molecules: (i) P_4O_6 (ii) P_4O_7 (iii) P_4O_8 (iv) P_4O_9 (v) P_4O_{10}. [5]

Q.5(b) What are metallocarboranes? Give two methods of preparation and also discuss its properties and structure. Discuss the structure of silicate based on the presence of anions in them. [5]

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