

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

CLASS: IMSc  
BRANCH: CHEMISTRY

SEMESTER : IX  
SESSION : MO/19

SUBJECT: SAC3001 BIOINORGANIC AND ORGANOMETALLIC CHEMISTRY

TIME: 3:00 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.
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- Q.1(a) What is the amount of Ca content in a healthy adult? Discuss the necessity of Ca in biological system. [6]  
What is the formula of calcium hydroxyapatite?
- Q.1(b) What is GTF? Discuss the role of chromium in biological system. [6]
- Q.2(a) Discuss the uptake, transport and storage of iron. [6]  
Q.2(b) What are siderophores? Discuss their functions. [6]
- Q.3(a) Discuss the function, structure and catalytic cycle of cytochrome P450. [6]  
Q.3(b) Describe Na<sup>+</sup>/K<sup>+</sup> ion pump. [6]
- Q.4(a) Write short notes on peroxidase. [6]  
Q.4(b) Draw the Z scheme and explain. [6]
- Q.5(a) Calculate the Valence Shell electrons in the following species: PtCl<sub>4</sub><sup>2-</sup>, Ferrocene, HMn(CO)<sub>5</sub> [6]  
Q.5(b) Discuss the structure and bonding in methyl-lithium. [6]
- Q.6(a) Describe the structure and bonding in Zeise's salt. [6]  
Q.6(b) Two cp rings in ZrCp<sub>2</sub>R<sup>1</sup>R<sup>2</sup> can not be distinguished- explain. [6]
- Q.7(a) Give example of the following: Fischer carbene, Kinetic and thermodynamic base in organometallics, Agostic species, Half Sandwich complex. [6]  
Q.7(b) Cp<sub>2</sub>V and Cp<sub>2</sub>Co do not possess 18 electron in the valence shell, still those species are stable - explain [6]  
in terms of Molecular Orbital Theory.

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