



Code No. : 9270

FACULTY OF SCIENCE  
M.Sc. II Semester Examination, May/June 2012  
CHEMISTRY  
Paper – I : Inorganic Chemistry

Time : 3 Hours]

[Max. Marks : 80

**Note :** Answer *all* questions.

SECTION – A

(4×8=32 Marks)

1. a) Write a note on plane of symmetry with suitable examples.  
b) Write a note on symmetry criteria for optical activity.
2. a) Discuss the L-S coupling and j-j coupling scheme.  
b) Define the terms states, microstates. Explain the various terms present in  $P^2$  configuration.
3. a) Write any two structures of low nuclearity clusters with examples related to  $M_4$  clusters.  
b) What is meant by dinuclear metal halide clusters ? Discuss the structural types in dinuclear metal-metal systems.
4. a) Distinguish between Hemerythrin and Hemocyanin.  
b) Discuss the various consequences occur in physiological system when metal ion concentration increases in biological system.

SECTION – B

(4×12=48 Marks)

5. a) Write symmetry and dipole moment.  
b) Define molecular point group and tabulate the classification of molecules with suitable examples.

OR

- c) Write a note on Inversion Center and Identity Element.
- d) Assign the following molecules to their appropriate point groups.
  - i)  $SO_2$
  - ii)  $CO_2$
  - iii)  $O_2SCl_2$
  - iv)  $BF_3$
  - v)  $OSCl_2$



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6. a) What are spin - orbital coupling parameters and discuss the factors affecting the magnitude.  
b) Explain the spectra of  $d^1$  and  $d^9$  configuration with the help of Orgel-diagram.

OR

- c) Write a note on hole formalism.  
d) Explain the Orgel diagram for  $d^8$  systems in tetrahedral and octahedral ligands giving electronic transitions.
7. a) Discuss the various factors favouring metal-metal bonding.  
b) Write a polyhedral skeletal electron pair theory.

OR

- c) Discuss the structural patterns in  $[\text{Os}_7(\text{CO})_{21}]$ ,  $[\text{Rh}_7(\text{CO})_{16}]^{3-}$  and  $[\text{Os}_{10}\text{C}(\text{CO})_{24}]^{2-}$ .  
d) Write a note on Capping rule with relevant examples.
8. a) Explain the reaction mechanisms  
i) Transamination                      ii) Decarboxylation.  
b) Discuss the deoxy forms, geometric, electronic and magnetic aspects of hemocyanin.

OR

- c) Explain the detailed note on structural aspects of chlorophyll.  
d) Discuss the structures and functions of haemoglobin and myoglobin.