

M.Sc.(Chemistry) (CBCS Pattern) Semester-I
PSCCHT01 - Paper-I : Inorganic Chemistry

P. Pages : 2

Time : Three Hours



GUG/W/24/11183

Max. Marks : 80

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1. a) Explain VSEPER Theory in details. 8
- b) Explain John teller distortion. 8

OR

- c) Why bond angle decrease in following order 4
 $\text{PI}_3 (102^\circ) > \text{PBr}_3 (101.5^\circ) > \text{PCl}_3 (100^\circ)$
- d) Write short note on bent rule. 4
- e) Explain M.O. theory for octahedral complex without π -bond. 4
- f) Give splitting of d-orbital in tetragonal complexes with suitable diagram. 4
2. a) Explain various factors affecting stability of metal complexes. 8
- b) Explain Base Hydrolysis Reaction of six-coordinated Co(III) Ammine complex. 8

OR

- c) Discuss Job's method to determine the composition of a complex. 4
- d) Give the relation between stepwise and overall formation constant. 4
- e) Explain stereochemistry of intermediates in SN^1 reaction. 4
- f) What is acid hydrolysis? Explain various stability constant of complex. 4
3. a) What do you know about banana bond in B_2H_6 , give M.O. treatment for the structure in B_2H_6 . 8
- b) What do you mean by Carboranes, give it's classification, & explain structure of any one carboranes. 8

OR

- c) Calculate styx number for B_5H_9 . 4

- d) Write a note on 3c-2c bond. 4
- e) What do you mean by cluster, give classification of Bovan hydrides. 4
- f) Discuss with one example of metalloborane? 4
- 4. a) Describe clearly halide type clusters. 8
- b) Explain in detail heteropoly acids. 8

OR

- c) Explain structure and bonding in $W_4(OR)_{16}$. 4
- d) Write classification of metal clusters. 4
- e) Write short note on metal-metal bond with suitable examples. 4
- f) Explain Hexanuclear clusters of halide with one example. 4
- 5. a) Explain the geometry of dF_3 , why distortion occurs. 16
- b) Explain the term high spin complex with one example.
- c) Write short note on Bent rule.
- d) Define the term Inert & Labile complex.
- e) Write one preparation of $C_2B_3H_7$.
- f) Draw the SN^2 mechanism diagrammatically.
- g) What is the auction of sodium or potassium amalgam on B_2H_6 .
- h) Write any two preparation of metallo carborenes.
