M.Sc. First Year (Chemistry) CBCS Pattern Semester-I

PSCCHT01 - Paper-I : Inorganic Chemistry

P. Pages : 2 **GUG/W/23/11183**

Time : Three Hours * 6 2 1 0 * Max. Marks : 80

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1. a) Explain VSEPER Theory and describe the geometry of PCl_5 and NH_3 molecules. **8**

b) Discuss M. O. T. for Tetrahedral complex. **8**

OR

c) Write short note on Bent rule. **4**

d) Discuss splitting of d-orbital in octahedral complexes. **4**

e) Give limitations of crystal field theory. **4**

f) What do you mean by high spin and low spin complex? Explain with suitable example. **4**

2. a) Explain various factors affecting stability of metal complexes. **8**

b) Explain in details stereochemistry in SN^1 and SN^2 in base hydrolysis. **8**

OR

c) Give difference between Labile and Inert complex. **4**

d) Explain the Irving-Ressotti method for determination of formation constant. **4**

e) Explain SNCB Mechanism for the base hydrolysis with suitable example. **4**

f) What is anation reaction? **4**

3. a) Calculate STYX Number of B_5H_9 & B_5H_{11}. **8**

b) What is Metalloboranes and Metallocarboranes. Explain the structure of AlB_3H_{12}. **8**

OR

c) Describe Nido carboranes with special references to small carboranes. **4**

d) Discuss different types of bond found in higher boranes. **4**

e) Discuss the structure of $C_2B_{10}H_{12}$. **4**

f) Explain different types of bond found in B_2H_6. **4**

4. a) Discuss the formation of trinuclear clusture Re3Cl9 and tetranuclear clusters W4(OR)16. **8**

b) Define metal carbonyl clustere and explain bonding in $Fe(CO)_9$ and $Fe_2(CO)_3$. **8**

OR

c) Explain heteropolyacid with suitable example. **4**

d) Define halide types of clusters. **4**

e) Give classification of metal clusters. **4**

f) Write short note on acetate clusters. **4**

5. a) Give the total counted electrons of $Os_5(CO)_{16}$. **2**

b) The STYX for B_6H_{10} is? **2**

c) Give limitation of CFT. **2**

d) Why bond order decreases from $Pl_3 > PBr_3 > PCl_3$. **2**

e) Give Geometry and magnetic property of $[Cr(CN)_6]^{-3}$. **2**

f) Using MO approach discuss the pi bonding in octahedral complexes. **2**

g) Explain the term high spin complex. **2**

h) How many different types of bond present in tetraborane 10. **2**

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