(ii) Nitrogen Molecule is diatomic, but phosphorus molecule is tetra atomic. **4**

(iii) NF_5 is not known while PF_5 is well known. **4**

6. (a) Give the preparation, properties and structure for the oxides of phosphorus. **6**

(b) Describe Polymorphism of Carbon and Sulphur. **7**

(c) Give a brief description of oxy acids of halogens. Give their important properties and structures. **7**

Unit IV

7. (a) Explain briefly the structure principle of silicates. **10**

(b) What are Boranes ? How are these classified ? Explain bonding in B_9H_{15} and $B_{10}H_{14}$. **10**

AA291

M. Sc. EXAMINATION, May 2019

(First Semester)

(B Scheme) (Re-appear)

CHEMISTRY

CH501B

Inorganic Chemistry–I

(Essential Inorganic Chemistry)

Time : 3 *Hours*] [*Maximum Marks :* 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Show various metal orbitals and composite ligand orbitals, which participate in *pi*-bonding octahedral complexes. **8**

(b) Give the limitations of Valence Bond Theory. **4**

(c) Discuss the consequences of Jahn-Teller effect on the electronic spectra of tetrahedral complexes. **8**

2. (a) The complexion $[Co(NH_3)_6]^{+3}$ is octahedral and diamagnetic whereas $[CoF_6]^{3-}$ is also octahedral but paramagnetic. How does valence bond theory account for this ? **8**

(b) Why variation of lattice energy with no. of *d* electrons is not smooth ? Explain. **4**

(c) Discuss the effect of pi-bonding in square planar complexes. **8**

Unit II

3. (a) Explain the chemistry of actinium and protactinium. **8**

(b) Describe the structure and bonding in Binary and Ternary compounds of Lanthanides. **8**

(c) Write short note on later actinides. **4**

4. (a) Describe the procedures generally adopted for extraction of mixture of lanthanides from monazite sand. **10**

(b) Actinides form oxocation but lanthanides do not. Why ? **6**

(c) Write a note on low oxidation state compound of lanthanides. **4**

Unit III

5. (a) Describe the structure of per-oxo compounds of Sulphur. **8**

(b) Explain with reasons :

(i) NH_3 has Higher boiling point than PH_3 **4**

8. (a) Explain the structure and bonding of carboranes ? Give their structure and bonding. **10**

(b) Describe the following reactions in liquid NH_3 giving suitable examples. **4,3,3**

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