(b) Explain with reasons :

(i) Increasing order of acidity of oxy-acids of chloride. **3**

(ii) Nitrogen module is diatomic, but phosphorus molecule is tetra-atomic. **3**

6. Discuss the preparation, properties and structure of the following :

(a) Halides of carbons **10**

(b) Oxides of nitrogen. **10**

Unit IV

7. Explain in detail the synthesis, properties and structure of borazines and silicates with at least *two* examples. **20**

8. (a) How can you classify phosphazenes in various categories ? Draw structure of trimeric phosphazenes, $P_3N_3Cl_3$. **10**

(b) What are boranes ? How are these classified ? Explain bonding in B_2H_6 and B_4H_9. **10**

AA-291

M. Sc. EXAMINATION, Dec. 2018

(First Semester)

(Re-appear Only)

CHEMISTRY

CH-501-B

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) Discuss the effect of π bonding in square planar complexes. **8**

(b) Explain the limitation of crystal field theory. **4**

(c) Calculate the CFSE for the following cases : **4**

(i) $[Mn(H_2O)_6]^{2+}$

(ii) $[CoCl_4]^{2-}$

(iii) $[TiF_6]^{3-}$

(iv) $[Co(NH_3)_6]^{3+}$

(d) Write a short note on spectrochemical series. **4**

2. (a) What are the crystal field effects ? Discuss the crystal field effect on ionic radii and heat of ligation. **8**

(b) Explain various metal orbitals and composite ligand orbitals, which participate in π-bonding in octahedral complexes. **12**

Unit II

3. (a) Compare the general characteristics of lanthanides and actinides. **8**

(b) Explain the uses of lanthanide compounds as shift reagents. **4**

(c) How does thorium react with hydrogen and oxygen ? Give the preparation and properties of ThO_2. **8**

4. (a) What are the consequences of lanthanide contraction ? **8**

(b) Discuss the chemistry of actinium and protactinium. **7**

(c) Write a short note on compounds of actinides containing sulphur and nitrogen. **5**

Unit III

5. (a) Give a brief description of oxy acids of phosphorus. Give their important properties and structure. **14**