Subject Code—58455

B. Sc. EXAMINATION

(Main/Reappear) (Batch 2018 Onwards)

(Fifth Semester)

CHEMISTRY

CCL-504(ii)

Paper–II

Chemistry of Main Group Elements–II

Time : 3 *Hours* *Maximum Marks* : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. **1** is compulsory. All questions carry equal marks.

(Compulsory Question)

1. (a) Draw the structure of $POCl_3$. **2**

(b) Give *one* method of preparation of XeF_2. **2**

P.T.O.

(c) Give *two* important applications of silicates. 2

(d) Noble gases have low boiling point. Why ? 2

(e) Explain the trend in acidic strength of hydrides of group 17 elements. 2

(f) Give *one* method of preparation of Diborane. 2

(g) Why are interhalogens more reactive than parent halogens ? 2

(h) Explain structure and bonding in BrF_5. 2

10

Unit I

2. (a) What is multicentre bonding ? Explain structure and bonding in diborane. 8

(b) Explain the basic and reducing nature of hydrides (EH_3) of group 15 elements. 4

(c) Explain the acidic strength of oxoacids of chlorine. 4

3. (a) Give the important applications of diborane. 4

(b) Draw and compare the structure of N_2O_5 and P_2O_5. 4

(c) Explain structure, basicity and oxidation state of P in the following oxoacids of phosphorus : 8

(i) H_3PO_3

(ii) $H_4P_2O_7$

(iii) H_3PO_2

(iv) $H_4P_2O_6$.

Unit II

4. (a) What are pseudohalogens and pseudohalides ? Explain by giving suitable examples. 6

(b) Compare the structure and geometry of $SOCl_2$ and SO_2Cl_2. 5

(c) Describe the structure and important applications of PCl_5. 5

5. (a) What are interhalogen compounds ? Explain by giving suitable examples. 6

(b) Compare the structure and geometry of ICl_3 in solid and gaseous state. 5

(c) Describe the structure and important applications of PCl_3. 5

Unit III

6. (a) How do noble gases form clathrates (cage compounds) ? Explain by giving an example. 6

(b) Give preparation, structure and two important properties of XeF_4. 6

(c) Give reasons for late discovery of compounds of noble gases. 4

7. (a) Explain the bonding in XeF_4 and XeF_6 using VBT. 6

(b) Give preparation, structure and *two* important properties of XeF_2. 6

(c) Why majority of noble gases compounds involves only fluorine and oxygen ? 4

Unit IV

8. (a) What are cyclophosphazenes ? Explain structure and bonding in $(NPCl_2)_3$. **8**

(b) Give the *four* important applications of silicones. **4**

(c) How is borazine $(B_3N_3H_6)$ structurally different from benzene ? **4**

9. (a) What are Silicates ? Give their classification and structure on the basis of SiO_4^{4-} tetrahedra linked together. **8**

(b) What are Silicones ? How are they prepared ? **4**

(c) Compare the chemical properties of borazine (inorganic benzene) with organic benzene. **4**