

Subject Code—55622

B. Sc. EXAMINATION

(Main/Re-appear) (Batch 2018 Onwards)

(Fifth Semester)

CHEMISTRY

Second Paper CCL-504 (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. Provide log table or simple calculator when required.

1. (a) How does Diborane reacts with water ?
- (b) What is back bonding ? Explain.
- (c) Which is more stable and why ? Pure halogen or interhalogen compounds ?

- (d) Write structure of PCl_5 solid state and in vapour state.
 - (e) Which noble gas is most difficult to liquify and why ?
 - (f) Why it is difficult to store XeF_6 in quartz vessel ?
 - (g) Give the name and structure of $\text{B}_3\text{N}_3\text{H}_6$.
 - (h) Discuss the structure of ortho silicate.
- $2 \times 8 = 16$

Unit I

2. (a) What are electron deficient compound ?
How do you account for the structure of diborane as electron deficient and give evidence in favour of this present structure of diborane. 12
- (b) Write the name, structure and oxidation state of P in the following acids : 4
- (i) H_3PO_3
 - (ii) H_3PO_2
 - (iii) HPO_3

3. (a) Give reasons of the following : 6

(i) CO_2 is gas while SiO_2 is solid at 25°C

(ii) H_2SO_4 is highly viscous liquid

(iii) NO is paramagnetic.

(b) Name four important oxo-acids of Chlorine, and draw their structures and also compare their strength. 10

Unit II

4. (a) Discuss geometry and hybridisation of the following : 6,6

(i) BrF_3

(ii) IF_7

(b) Discuss the reaction of PCl_5 with water.

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5. (a) Write short note on Pseudohalogens and pseudohalides. 8

(b) What are interhalogen compounds ?
Discuss their general properties. 8

Unit III

6. (a) Give reasons of the following :
- (i) Why Xe form compounds with only fluorine and oxygen ? 3
 - (ii) What are Clathrates ? 2
 - (iii) Why very little possibility of Ne form chemical compounds ? 3
- (b) Explain and discuss the structure and preparation of XeF_6 . 8
7. (a) Explain and discuss important reactions and structure of XeF_4 . 8
- (b) Give reasons of the following :
- (i) XeF_2 is linear but it is sp^3d hybridised. Why ? 3
 - (ii) Solubility of noble gases in water increases as their atomic number increases in the group. 3
 - (iii) Which prompted use Bartlett to react Xe with fluorine to form the first noble gas compound ? 2

Unit IV

8. (a) Explain the preparation of silicones and factors affecting nature of silicone polymers also explain the applications of silicone polymers. 12
- (b) Draw the structure of $(\text{NPCl}_2)_3$ and give the properties and preparation of this compound. 4
9. Define silicates and discuss different form of silicates based on SiO_4^{-4} . 16