

Subject Code—52609

B. Sc. EXAMINATION

(Batch, 2018) (Main)

(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. Provide log table or simple calculator when required.

1. (a) What is catenation property and what are conditions for catenation ? $2 \times 8 = 16$
- (b) What is $P\pi-d\pi$ (P-pi-d-pi) bonding ? Explain.

- (c) Why interhalogenes are more reactive than parent halogens ?
- (d) Why PCl_5 is ionic in solid state ?
- (e) Which noble gas is most difficult to liquify and why ?
- (f) Why is it different to store XeF_6 in glass container ?
- (g) Give the name and structure of inorganic borazine.
- (h) Discuss the structure of sheet silicate.

Unit I

2. (a) Why is diborane termed as an electron deficient compound ? Sketch its structure. What is unusual about bonding in this compound ? What happens when diborane reacts with water ? 10
- (b) Write the name and structure and oxidation state of P in the following acids : 6
- (i) H_3PO_3
 - (ii) $\text{H}_4\text{P}_2\text{O}_6$
 - (iii) H_3PO_5

3. (a) Give reasons of the following :

(i) H_2O is not good reducing agent as

H_2S 6

(ii) NO_2 easily Dimerises while NO is not

(iii) HPO_2 is unknown.

(b) Name five important oxo-acids of

Sulphur, and draw their structures. 10

Unit II

4. (a) Discuss geometry and hybridisation of the following : 5,5

(i) ClF_3

(ii) IF_7

(b) Giving suitable example, describe the reducing nature of PCl_3 . 6

5. (a) What are Pseudohalogens ? Give their method of preparation and properties. Compare their properties with halogens.

10

- (b) What are interhalogen compounds ? Give evidence to show that iodine behave as a cation. 6

Unit III

6. (a) Give reasons of the following : 3
- (i) Why most of the compounds of noble gases involve only fluorine and oxygen ?
 - (ii) Why do helium and neon not form clathrates ? 2
 - (iii) Late discovery of compounds of noble gases. 3
- (b) Explain and discuss the structure and preparation of XeF_4 . 8
7. (a) Explain and discuss preparation and structure of XeF_2 . 8
- (b) Give reasons of the following :
- (i) There is very little possibility of the formation of compounds of He. Why ? 3

- (ii) Melting point and Boiling point of noble gases are extremely low. Why ? 3
- (iii) Electron Affinity of Noble gases is almost zero. Why ? 2

Unit IV

8. (a) Mention the preparation of silicones and give their applications. 12
- (b) Draw the structure of Inorganic Benzene and which reaction makes it different from organic benzene. 4
9. What are Silicates ? Discuss different form of silicates based on the tetrahedral structure of SiO_4^{-4} ion. 16