[This question paper contains 2 printed pages.]

Sr. No. of Question Paper : 2329 **F–4** **Your Roll No.....**

Unique Paper Code : 2171402

Name of the Course : **B.Sc. (H) CHEMISTRY**

Name of the Paper : Inorganic Chemistry of p-Block Elements (Paper 8)

Semester : IV

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **five** questions.
3. **All** questions carry equal marks.

1. Explain any **five** of the following :
   (a) Basicity and dipole moment of ammonia is higher than phosphine.
   (b) $HClO_4$ is a stronger acid than $HClO_3$, $HClO_2$ and HClO.
   (c) Silicones are inert and water repellant.
   (d) IF_7 is not stored in Pyrex glass bottles.
   (e) Graphite is soft and a good conductor of electricity.
   (f) H_3BO_3 is a weak acid in aqueous solution but behaves as strong acid in presence of polyhydroxy compounds.
   (g) Though electron gain enthalpy of Cl is greater than that of F, yet F_2 is a stronger oxidizing agent. Explain. (3×5)

2. (a) How does diborane react with (i) O_2, (ii) H_2O, (iii) NH_3 (under different conditions) ?
   (b) (i) Explain why silanes are more reactive than alkanes.

P.T.O.

(ii) Large number of silicates and polyphosphates are known, lesser number of polysulphates are known but no polychlorates are known. Explain.

(c) What are intercalation compounds ? Compare the properties of alkali metal intercalation compounds and graphite. (5,5,5)

3. (a) Explain the bonding involved in $(NPCl_2)_3$. List some uses of phosphazenes.

(b) (i) HF is more ionic than HCl but weaker acid than HCl. Why ?

(ii) When heated, sulphur melts to a mobile liquid, but on further heating the viscosity increases sharply and then decreases again. Explain.

(c) What are interhalogen compounds ? Why are they more reactive than halogens ? Discuss the structure and hybridization of ClF_3. (5,5,5)

4. (a) Define clathrate compounds ? Which noble gases do not form clathrates and why ? Give the general formula of noble gas clathrates.

(b) What are zeolites ? What are the main uses of zeolites and how does their structure help in these uses ?

(c) (i) What do you mean by "pseudohalogens" ? Write two similarities between pseudohalogens and halogens.

(ii) BrF_3 acts as a good non-aqueous solvent. Justify. (5,5,5)

5. (a) How will you prepare XeF_2 and XeF_4 ? Give molecular orbital diagram for XeF_2.

(b) Compare the basicity and reducing powers of H_3PO_4, H_3PO_3 and H_3PO_2. Give reasons for your answers.

(c) Draw structures of Borax and N_2O_5.

6. Write short notes on any **three** of the following :

(a) Borazine

(b) Peroxoacids of sulphur

(c) Oxides of phosphorous.

(d) Inert pair effect (3×5)

(2500)