

This question paper contains 4 printed pages]

Your Roll No.

1252

18/00

B.Sc. (Hons.) II

A

CHEMISTRY—Paper VII

(Inorganic Chemistry—II)

Time : 3 Hours

Maximum Marks : 38

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt six questions in all.

Q. No. 1 is compulsory.

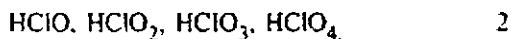
1. Giving reasons explain any *four* of the following :
- (a) Lithium is as strong a reducing agent as Cesium in aqueous solution.
 - (b) Solubility of sulphates of group 2 elements decreases down the group.
 - (c) First ionization energy of group 13 elements (B to Tl) shows irregular periodic trends

P. T. O.

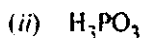
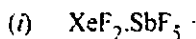
- (d) Trimethylamine is pyramidal in shape, while trisilylamine is planar.
- (e) White phosphorus is highly reactive while molecular nitrogen is not.
- (f) F-F bond is weaker than Cl-Cl bond.
- (g) Molecular oxygen is paramagnetic. 4×2
2. (a) Draw an Ellingham diagram for metal oxides and explain why most of the lines slope upwards from left to right. Why, in some cases, does the slope of the lines change abruptly ? 4
- (b) Discuss the role of activators and depressants in froth floatation process. 2
3. (a) Explain what is total hardness of water. Suggest a method to determine the hardness of water using EDTA.
- (b) Alkaline earth metals are harder, denser and have higher melting and boiling points as compared to alkali metals. Explain.

- (c) Relative Lewis acid strength of boron halides is in the order $\text{BBR}_3 > \text{BCl}_3 > \text{BF}_3$ which is contrary to what would have been expected on the basis of electronegativities of the substituents. Explain. 3×2
4. (a) Why are silanes more reactive than alkanes ?
- (b) Which one has higher bond energy NO or NO^+ ? Explain.
- (c) Though electron affinity of Cl is greater than that of F , yet F_2 is a stronger oxidizing agent. Explain. 3×2
5. (a) Discuss the structure and bonding in diborane in terms of valence bond theory.
- (b) How is diborane converted to borazine and boron nitride ? 2×3
6. (a) What are interhalogen compounds ? Why are they more reactive as compared to halogens ? Using VSEPR theory, discuss the structures of ClF_3 and BrF_5 . 4

- (b) Giving reasons, arrange the following in order of increasing acid strength :



7. (a) Draw the structure of any *three* of the following :



(iii) Marshall's acid

(iv) Caro's acid. 3

- (b) How is XeF_2 prepared ? Give its reaction with water and fluorine. 3

Or

Write brief notes on any *three* of the following :

(a) Hydrometallurgy

(b) Lamellar compounds of graphite

(c) Inert-pair effect

(d) Solutions of alkali metals in liquid ammonia. 3×2