

SET-A

Your Roll No. :
Sl. No. of Q. Paper :
Unique Paper Code : 32171301_OC
Name of the Course : B.Sc. (H) Chemistry
Name of the Paper : Chemistry C-V Inorganic Chemistry II:
s- and p- Block Elements
Semester : III

Duration: 2 Hours

Maximum Marks : 75

Instructions for Candidates:

- (i) Write your Roll No. on the top immediately on receipt of this question paper.
- (ii) Attempt any **four** questions.
- (iii) All questions carry equal marks.

Q1. Explain **any five** of the following, giving suitable reasons:

- (a) Boric Acid is a weak acid in aqueous solution but behaves as strong acid in presence of polyhydroxy compounds.
- (b) Alkaline earth metals are harder, denser and have higher melting and boiling points as compared to alkali metals.
- (c) Silicones are inert and water repellent.
- (d) NH_3 has higher basicity and dipole moment than PH_3 .
- (e) Iodine has very low solubility in water and high solubility in aqueous solution of KI.
- (f) The reaction $\text{PbCl}_2 + \text{Cl}_2 \rightarrow \text{PbCl}_4$ is reversed at 25°C while the reaction $\text{GeCl}_2 + \text{Cl}_2 \rightarrow \text{GeCl}_4$ is rapid at the same temperature.

(3.75 x 5)

Q2. (a) Explain using Ellingham diagram, why metal oxides are unstable at high temperatures. Why in some cases does the slope of line in the diagram change abruptly?

- (b) Draw and explain the electron deficient structure of diborane. How does diborane react with NH_3 under different conditions?
- (c) Draw the structure of oxyacids of chlorine in various oxidation states and arrange them in order of increasing acidic strength. Justify your answer.

(6.25, 6.25, 6.25)

Q3. (a) Explain the bonding involved in the cyclic structure of phosphazene. What will be the product of hydrolysis of $(\text{NPCl}_2)_3$.

(b) Differentiate between interhalogen and pseudohalogen compounds. Why are interhalogen compounds more reactive than halogens?

(c) Draw the structure of basic beryllium acetate. Why Be forms more complex compounds than other members of the same group?

(6.25, 6.25, 6.25)

Q4. (a) On heating, Sulphur melts to a mobile liquid but on further heating the viscosity increases sharply and then decreases again. Explain

(b) What is hydrometallurgy? Describe using chemical reaction the cyanide method for the extraction of Ag.

(c) Chemistry of Boron is similar to Silicon. Give examples in support of the statement.

(6.25, 6.25, 6.25)

Q5. (a) Complete and balance the following reactions. (**Any Five**)

(i) $\text{BeO} + \text{NaOH} \rightarrow$

(ii) $\text{B}_2\text{H}_6 + \text{H}_2\text{O} \rightarrow$

(iii) $\text{SiH}_4 + \text{CuSO}_4 \rightarrow$

(iv) $\text{P}_4 + \text{SOCl}_2 \rightarrow$

(v) $\text{H}_2\text{SO}_4 + \text{H}_2\text{S} \rightarrow$

(vi) $\text{U} + \text{ClF}_3 \xrightarrow{50-90^\circ\text{C}}$

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

(c) How is borazine prepared? Why is it called inorganic benzene? Compare and contrast the chemical properties of borazine and benzene.

(6.25, 6.25, 6.25)

Q6. Write short notes on (any three):

(a) Zone refining

(b) Allotropes of Phosphorous

(c) Solutions of alkali metals in Liquid Ammonia

(d) Peroxoacids of Sulphur

(6.25, 6.25, 6.25)