

3/12/19 M

[This question paper contains 4 printed pages]

Your Roll No. :

Sl. No. of Q. Paper : **7393 J**

Unique Paper Code : 32171301

Name of the Course : **B.Sc.(Hons.) Chemistry**

Name of the Paper : **Inorganic Chemistry - II :
s and p block elements**

Semester : III

Time : 3 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 **five** questions.
- (iii) All questions carry equal marks.

1. (a) Explain why most lines in the Ellingham diagram slope upward from left to right. What happens when a line crosses $\Delta G=0$? 5

(b) Why is white phosphorus very reactive in comparison to red phosphorus ? Give the mechanism of stepwise hydrolysis of P_4O_{10} . 5

P.T.O.

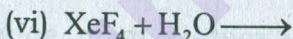
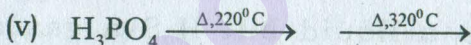
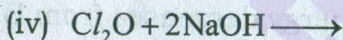
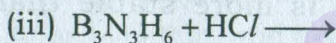
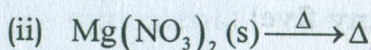
- (c) How will you obtain the following : 5
 (i) B-bromoborazine from borazine
 (ii) $(\text{NPF}_2)_3$ from $(\text{NPCl}_2)_3$
2. (a) Chemistry of Lithium is different from other alkali metals. Give examples in support of the statement. 5
 (b) What are clathrate compounds of noble gases? Why do helium and neon not form clathrates? 5
 (c) Give one method of preparation of peroxodisulphuric acid. What is the oxidation state of Sulphur in it? Give one reaction in support of its strong oxidizing nature. 5
3. (a) Name the class of silicates present in the following minerals. Write the basic silicate unit present in them and give their structure 5
 (i) Zircon
 (ii) Emerald or Beryl.
- (b) Among the alkaline earth metals (except Beryllium), which will (a) have the most insoluble sulfate; (b) be the softest metal. Give reason. 5

- (c) Discuss the structure and bonding in Diborane. What are the products formed when diborane reacts with excess ammonia at 5
 (i) low temperature
 (ii) high temperature
4. Give reason (any five) : $3 \times 5 = 15$
 (i) P_4 molecule is more stable than the P_2 molecule.
 (ii) Ionization energy decreases from B to Al but increases from Al to Ga.
 (iii) H_2O a liquid but H_2S a gas at room temperature.
 (iv) Only the alkali metals form solid, stable hydrogen carbonate salts.
 (v) The bond angle in NH_3 is 107° while in PH_3 is 93° .
 (vi) Interhalogens are more reactive than the halogens.
5. (a) Explain briefly the complex formation tendency of the alkali metals with special reference to crown ethers and cryptands. 5
 (b) (i) What are pseudohalogen compounds? 2.5

- (ii) Draw the structure of the following compounds: 2.5

ICl_3 , H_2SO_5 , Basic Beryllium acetate

- (c) Complete the following (any **five**): 5



6. Write short notes on (any **three**): $5 \times 3 = 15$

(a) Allotropes of Carbon

(b) Hydrometallurgy

(c) Inert pair effect

(d) Craig and Paddock model for imperfect delocalization of π -electrons in $(\text{NPCl}_2)_3$.