

CHEMISTRY Paper-V

(Inorganic Chemistry-B)

Time : 3 Hours

Max. Marks : 22

Note : (i) Attempt *five* questions in all, selecting *one* question from each Unit.

(ii) Unit-V is compulsory.

(iii) Be brief and specific in your answer.

Unit-I

- (a) Define and draw Tetrahedral and Octahedral voids. What are their sizes ? How many of it are associated with each constituents particle in a closed packed structure ?
- (b) Show that there are four NaCl formula units in a unit cell of sodium chloride. 22
- (a) Show that changing size of cation or anion, co-ordination number also changes.
- (b) What are the consequences of Shottky defects?
- (c) What is basic difference in *n*-type and *p*-type semiconductor? 2, 1, 1

Unit-II

3. Give reasons to explain:

(i) Which have high B.P. – H_2O or H_2S ?

(ii) Which have high B.P. – Kr or Ar?

(iii) Which have high M.P. – $HgCl_2$ or $CaCl_2$?

(iv) Covalent or Ionic bonding is not possible in metals. 1,1,1,1

4. (a) Draw BORN-HABER cycle to calculate proton Affinity for Ammonia in the formation of $\text{NH}_4\text{Cl}(s)$.
 (b) Is covalent character possible in Ionic compounds? Explain polarization and polarizability giving example. 22

Unit-III

5. (a) While moving down the group in periodic table size increases but aluminium (143 pm) has larger size as compared to Gallium (135 pm), why?
 (b) Show various product while H_3BO_3 is heated at different temperature.
 (c) Draw structure of Borazine. Why it is called inorganic benzene?
 (d) Draw bonding in B_2H_6 , showing important parameters. 1,1,1,1
6. (a) How many pentagonal and hexagonal faces are therein C_{60} fullerene?
 (b) How CaC_2 and Al_4C_3 differs?
 (c) Lewis acid character of BF_3 is very low, why?
 (d) CCl_4 cannot be hydrolysed but SiCl_4 can be easily hydrolysed, why? 1,1,1,1

Unit-IV

7. (a) What is the structure of PCl_5 in solid and vapour state?
 (b) Why H_2SO_4 act as oxidising agent? Give an example to show its oxidising character.
 (c) Give an example of oxide of N, which have/is :
 (i) blue solid
 (ii) laughing gas
 (iii) N have +2 oxidation state
 (iv) paramagnetic character 1,1,2
8. (a) Complete the reactions :
 (i) $\text{P}_4\text{O}_6 + \text{H}_2\text{O} (\text{hot}) \rightarrow$
 (ii) $\text{P}_2\text{O}_5 + \text{H}_2\text{O} (\text{cold}) \rightarrow$
 (b) Why reactivity of interhalogen compounds is more as compared to parent halogens?
 (c) I_3^- exists but F_3^- not exists, why?
 (d) Bond angle in OF_2 is smaller than Cl_2O , why? 1,1,1,1

Unit-V

9. (a) How many particles are there in FCC Unit cell?
 (b) Give an example which shows both Schottky and Frankel defects.
 (c) Boric acid is not a protonic acid, how?
 (d) Give structure of S_4N_4 .
 (e) What is oxidation state of nitrogen in hydrozoic acid HN_3 ?
 (f) Arrange in order of increasing acidic strength :
 $\text{HClO}_4, \text{HClO}_3, \text{HClO}_2, \text{HClO}$ 1×6=6