

CHEMISTRY Paper-V

(Inorganic Chemistry-B)

Time Allowed : 3 Hours]

[Maximum Marks : 22

- Note :** (i) Attempt five questions in all, selecting one question from each Unit..
- (ii) UNIT-V is compulsory.
- (iii) Be brief and precise in your answers.

UNIT-I

1. (a) How many tetrahedral and octahedral voids are associated with each constituent particle in a closed packed structure? 1
- (b) Show how by changing the size of cation or anion, co-ordination number also changes. 2

- (c) Give an example of compound which shows both Schottky and Frankel defects. 1
2. (a) What are the consequences of Schottky and Frankel defects? 2
- (b) Show that there are four formula units of NaCl in the unit cell of sodium chloride. 2

UNIT-II

3. (a) Draw Born-Haber cycle to calculate Proton-Affinity for Ammonia(ou-linearly) in the formation of $\text{NH}_4\text{Cl}(s)$. 2
- (b) Can Ionic compound have covalent character? Explain Polarization and Polarizability. 2
4. (a) Which have high B.P. and why :
- (i) o-Nitrophenol and
- (ii) p-Nitrophenol. 1
- (b) Which have high M.P. and why :
- HgCl_2 and CaCl_2 . 1
- (c) Why covalent or ionic bond is not possible in metals? 1
- (d) Which had high B.P. and why-Kr or Ar? 1.

UNIT-III

5. (a) Why Aluminium has slightly more radius as that of Gallium?
(Al = 143 pm. Ga = 135 pm) 1
- (b) $\text{H}_3\text{BO}_3 \xrightarrow{100^\circ\text{C}} ? \xrightarrow{160^\circ\text{C}} ? \xrightarrow{\text{red hot}} ?$
Complete the reaction. 1
- (c) Draw structure of B_2H_6 showing important parameters. 1
- (d) Draw structure of Borazine. Why it is called inorganic benzene? 1
6. (a) Why carbon does not show any tendency for complex formation whereas other elements like Si, Ge, Sn shows? 1
- (b) How CaC_2 and Al_4C_3 differs? 1
- (c) Write a brief note on FULLERENES. 2

UNIT-IV

7. (a) Give an example of oxide of Nitrogen which have:
- (i) N is +2 oxidation state
- (ii) Laughing gas
- (iii) Paramagnetic
- (iv) Blue solid. 2

- (b) What structure PCl_5 adopts in solid and vapour state? 1
- (c) SF_6 have zero dipole moment whereas SF_4 do not? 1
8. (a) Why Interhalogens compounds are more reactive than parent halogens? 1
- (b) I_3^- is known whereas F_3^- is not known. Why? 1
- (c) Give structure of S_4N_4 . 1
- (d) Complete the $r \times n$:
- (i) $\text{P}_4\text{O}_6 + \text{H}_2\text{O} \xrightarrow{\Delta}$
- (ii) $\text{P}_2\text{O}_5 + \text{H}_2\text{O}(\text{cold}) \rightarrow$ 1

UNIT-V

9. (a) How many particles are there in bcc unit cell?
- (b) Give basic difference between n-type and p-type semi conductors.
- (c) Boric acid is not a protonic acid, explain.
- (d) How many pentagonal faces and hexagonal faces are there in C_{60} fullerene?
- (e) Arrange in order of increasing acidic strength :
 HClO , HClO_2
 HClO_3 , HClO_4
- (f) What is basic structural unit of silicates? $6 \times 1 = 6$