



TKN/KS/16/5760

**Bachelor of Science (B.Sc.) Semester—I (C.B.S.)  
Examination  
CHEMISTRY**

**Compulsory Paper—I**

**CH-101 : Inorganic Chemistry**

Time : Three Hours]

[Maximum Marks : 50

**N.B. :—** (1) All *five* questions are compulsory and carry equal marks.

(2) Write equation and draw diagrams wherever necessary.

1. (A) Explain with example :

(i) Hund's rule of Maximum multiplicity, and

(ii) Pauli's Exclusion principle. 5

(B) Define electronegativity. How is it determined by Pauling's scale of electronegativity ? Discuss its variation in a period and in a group. 5

**OR**

1. (C) Write electronic configuration of :

(i)  $\text{Cl}^-$

(ii)  $\text{Al}^{+3}$

(iii) P

(iv) Cr

(v) Cu.

(Given Atomic no. of Cl = 17, Al = 13, P = 15,  
Cr = 24 and Cu = 29). 2½

- (D) Write Schrodinger wave equation and state the terms involved in it.  $2\frac{1}{2}$
- (E) Define ionisation potential. Discuss any three factors affecting it.  $2\frac{1}{2}$
- (F) Calculate effective nuclear charge for 4s electron in Potassium ( $Z = 19$ ).  $2\frac{1}{2}$
2. (A) What is hybridisation ? Discuss the type of hybridisation and geometry in  $\text{BeCl}_2$  and  $\text{PCl}_5$ . 5
- (B) Define Lattice energy. Explain how Born-Haber cycle is used to determine Lattice energy of ionic solids. 5

OR

2. (C) Give the postulates of valence bond theory.  $2\frac{1}{2}$
- (D) Explain the structure of  $\text{ClF}_3$  using VSEPR theory.  $2\frac{1}{2}$
- (E) Discuss the structure of  $\text{NaCl}$ .  $2\frac{1}{2}$
- (F) Discuss the degree of polarization of anion and cation with respect to :
- (i) Charge, and
  - (ii) Size of cation.  $2\frac{1}{2}$

3. (A) Discuss the following properties of s-block elements with respect to :

(i) Reducing properties, and

(ii) Atomic and ionic radii. 5

- (B) Discuss the structure and bonding in  $\text{XeF}_6$  and  $\text{XeOF}_2$ . 5

**OR**

3. (C) Discuss diagonal relationship between Lithium and Magnesium.  $2\frac{1}{2}$

(D) Explain how hydrogen bonding affects the solubility of the compound.  $2\frac{1}{2}$

(E) Discuss the structure and bonding in Xenon tetrafluoride.  $2\frac{1}{2}$

(F) What happens when Xenon difluoride reacts with —

(i)  $\text{HCl}$  and

(ii)  $\text{H}_2$  gas ?  $2\frac{1}{2}$

4. (A) Discuss the following properties of p-block elements :

(i) Oxidation state, and

(ii) Electronegativity. 5

- (B) Write one method of preparation of Caro's and Marshall's acid. Discuss the structure of Marshall's acid. 5

**OR**

MXP-L-2474



4. (C) Discuss diagonal relationship between Boron and Silicon.  $2\frac{1}{2}$

(D) Discuss the structure and bonding in Borazine.  $2\frac{1}{2}$

(E) Compare Ionisation potential of p-block elements.  $2\frac{1}{2}$

(F) Draw the structures of :

(i)  $P_2O_3$  and

(ii)  $P_2O_3$ .  $2\frac{1}{2}$

5. Attempt any **ten** of the following :

(i) Define electron affinity.

(ii) Draw the shape of  $dx^2-y^2$  orbital.

(iii) What are quantum numbers ?

(iv) Define bond energy.

(v) Give any two limitations of valence bond theory.

(vi) Define solvation energy.

(vii) Write general electronic configuration of s-block elements.

(viii) What are types of hydrogen bonding ?

(ix) Draw the structure of  $XeOF_4$ .

(x) What is p-block elements ?

(xi) Draw the structure of  $PH_3$ .

(xii) Draw the structure of  $H_3PO_4$ .

$1 \times 10 = 10$