NKT/KS/17/5045

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

CHEMISTRY

(Inorganic Chemistry)

Compulsory Paper—1

Time : Three Hours] [Maximum Marks : 50

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

(2) Write equations and draw diagrams wherever necessary.

1. (A) State and explain :

(i) Heisenberg's uncertainty principle and

(ii) Hund's rule of maximum multiplicity. 5

(B) Define ionization potential. What are the factors affecting it ? How does it vary in a group and in a period ? 5

OR

(C) What are quantum numbers ? Discuss the significance of principal quantum number. 2½

(D) Discuss Pauling scale of electronegativity. 2½

(E) Calculate the effective nuclear charge for a 3d electron in zinc atom (Z = 30). 2½

(F) Write Schrodinger wave equation for hydrogen atom and give the significance of the terms associated with it. 2½

2. (A) Explain Heitler and London treatment for the formation of H_2 molecule with potential energy diagram. 5

(B) Define solvation and solvation energy of ions. How is lattice energy determined for ionic solid by Born-Haber cycle ? 5

OR

(C) Discuss sp^3d^2 hybridization with suitable example. 2½

(D) Using VSEPR theory explain the structure of H_2O molecule. 2½

(E) Discuss the structure of NaCl. 2½

(F) Discuss the Fajan's rule. 2½

3. (A) What are S-block elements ? Write electronic configuration of S-block elements. 5

(B) Discuss the structure and bonding in

(i) XeF_6 and

(ii) $XeOF_4$. 5

OR

(C) Discuss diagonal relationship between lithium and magnesium. 2½

(D) Define hydrogen bonding. Explain why H_2O is liquid while H_2S is gas. 2½

(E) What happens when Xenon tetrafluoride reacts with :

(i) Hydrochloric acid and

(ii) Hydrogen gas ? 2½

(F) Discuss the structure and bonding in Xenon-difluoride. 2½

4. (A) What are p-block elements ? Discuss the following properties of block elements with respect to :

(i) Atomic and ionic radii and

(ii) Oxidation state. 5

(B) Explain the structure and bonding in diborane. 5

OR

(C) Compare electronegativity of 'p' block elements. 2½

(D) Discuss diagonal relationship between Boron and Silicon. 2½

(E) What are peroxyacids ? Discuss the structure of Caro's acid. 2½

(F) What are hydrides ? Draw the structure of NH_3 and PH_3. 2½

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

(i) Define electron affinity. 1

(ii) Define screening constant. 1

(iii) Draw the shape of dz^2 orbitals. 1

(iv) Write any two limitations of VBT. 1

(v) Give the geometry and type of hybridization of PCl_5. 1

(vi) Define polarizing power of anion. 1

(vii) What are types of Hydrogen bonding ? 1

(viii) Draw the structure of $XeOF_2$. 1

(ix) Why S-block elements act as reducing agent ? 1

(x) Draw the structure of P_2O_3. 1

(xi) Draw the structure of P_2O_5. 1

(xii) Which element is more electronegative in p-block elements ? 1