B.Sc. (C.B.C.S. Pattern) Sem-I

USCHT01 - Chemistry Paper-I (Inorganic Chemistry)

P. Pages : 2 **GUG/S/19/11544**

Time : Three Hours * 3 4 3 9 * Max. Marks : 50

Notes : 1. All questions are compulsory & carry equal marks.
2. Draw diagram whenever necessary.

1. a) Define electron affinity. Explain factors affecting on it and trends of electron affinity in a group and period. **5**

b) State and explain Pauli's exclusion principle. Draw the shape of S and P-orbitals. Calculate de Broglie wavelength of a ball of 0.2 kg mass with velocity $3x10^{10}$ cm/s. **5**

OR

c) Derive de Broglie relation to prove dual nature of electron. **2½**

d) Write note on Heisenberg's uncertainty principle. **2½**

e) Discuss Pauling scale of electronegativity. **2½**

f) Calculate screening constant and effective nuclear charge for 3d electron in Nickel (Z = 28) **2½**

2. a) Define hybridisation? Explain steps involved in hybridisation. Explain the formation of PCl_5 molecule. on the basis of hybridisation. **5**

b) Draw and explain Coulson's M.O. diagram of NO molecule? Calculate bond order of NO. **5**

OR

c) Explain the postulates of Valence bond theory. **2½**

d) Explain the shape of CI_{F_3} using VSEPR theory. **2½**

e) Distinguish between bonding molecular orbital and antibonding molecular orbital. **2½**

f) Explain why helium not form diatomic molecule? **2½**

3. a) Discuss 'S' block elements with respect to **5**
i) Ionisation potential ii) Reducing property.

b) Discuss the structure of following. **5**
i) Pyrophosphoric acid $(H_4P_2O_7)$ ii) Orthophosphoric acid (H_3PO_4)

OR

c) Explain diagonal relationship between Li and mg. **2½**

d) Discuss the function of S-block elements in bio-system. **2½**

e) Discuss the structure of P_2O_5. **2½**

f) Discuss the properties of hydrides of p-block elements. **2½**

4. a) Explain structure of **5**

i) X_eF_4 ii) X_eOF_4

b) What is mean by complexometric titration? Discuss Quinonied. Theory of acid base titration. **5**

OR

c) Define hydrogen bond? Explain the types of hydrogen bond with examples. **2½**

d) Explain the properties of Nobel gas. **2½**

e) Explain the role of metal chrome indicator in complexometric titration. **2½**

f) Explain the principle of Redox titration. **2½**

5. Solve **any ten.**

a) Electronic configuration of **1**

i) Cr (z = 24) ii) Cu (z = 29)

b) Why radius of cation is lower than that of its parent atom. **1**

c) What is Hund's rule of maximum multiplisity. **1**

d) Write two postulates of VSEPR – theory. **1**

e) Define bond energy. **1**

f) Draw M.O. Diagram of Beryllium. **1**

g) Define the term solvation. **1**

h) Aluminium is good reducing agent explain. **1**

i) The alkali metal ions are heavily hydrated why? **1**

j) How Hydrogen bonding affect viscosity. **1**

k) Define internal indicator and external indicator. **1**

l) Name the indicator selected for following titration. **1**

i) Strong Acid Verses strong base.

ii) Week acid Verses weak base.

****