B.Sc. (CBCS Pattern) Semester - I

USCHT01 - Chemistry Paper-I (Inorganic Chemistry)

P. Pages : 2 **GUG/S/23/11544**

Time : Three Hours * 1 6 7 5 * Max. Marks : 50

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1. a) What are quantum numbers? Discuss principle and Azimuthal quantum number. **5**

b) What is Ionization energy? Mention the factors affecting on it and trends of IP in period as well as in group. **5**

OR

c) State de-Broglie hypothesis and derive equation giving relation between wavelength and momentum. **2½**

d) State and explain the Hund's rule of maximum multiplicity. **2½**

e) Calculate effective nuclear charge faced by the 3s electron of sodium atom? (Atomic number of Na-11) **2½**

f) Explain why electron affinity of fluorine is less than that of chlorine? **2½**

2. a) Define-Hybridization. Describe $sp^3 d^2$ and sp^3hybridization with suitable examples. **5**

b) What is LCAO approximation? Explain Coulson Molecular Orbital diagram for CO molecule. **5**

OR

c) Diatomic molecule of Helium does not exist. Explain on the basis of MO theory? **2½**

d) Explain the structure and bonding in B_2 molecule on the basis of MO theory? **2½**

e) Discuss the structure of NH_3 molecule on the basis of VSEPR theory. **2½**

f) State the assumptions of Valence Bond Theory (VBT). **2½**

3. a) Explain following properties of S block element with respect to i) Atomic and ionic radii ii) reducing properties. **5**

b) What do you mean by diagonal relationship? Discuss the diagonal relationship between Be and A1. **5**

OR

c) Discuss the applications of S block elements in bio system. **2½**

d) Explain the Solvation property of S block elements. **2½**

e) Discuss the structure and bonding in Phosphorus trioxide? **2½**

f) Explain the oxidation state of p block elements? **2½**

4. a) Discuss the structure and bonding in XeF_2 and $XeOF_4$. **5**

b) What is Complexo-metric titration? Discuss the theory of complexometric titration. **5**

OR

c) What is hydrogen bonding? Discuss the effect of hydrogen bonding on viscosity and solubility. **2½**

d) State the chemical properties of noble gas and explain why Xe is capable of forming its compounds with Fluorine and oxygen? **2½**

e) Explain the principle involved in redox titration? **2½**

f) Describe Ostwald theory of Acid base titration in detail. **2½**

5. Answer the following questions **any ten.** **10**

i) State mathematical equation of Heisenberg Uncertainty principle?

ii) Give any two limitations of Bohr atomic theory?

iii) Give equation for Mulliken Scale of electronegativity?

iv) Define
i) Bond order ii) Bond energy

v) Draw geometry in SF_4 and ClF_3?

vi) Give difference between Bonding MO and Anti-bonding MO.

vii) Draw the structure of phosphorus Pentaoxide?

viii) State any two silent features of hybride of a block elements?

ix) Draw the structure of Orthophosphoric acid?

x) Give type of hybridization and shape of XeF_6?

xi) Give one example of Internal and External indicator?

xii) what is acid base titration? Give one example of it.

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