

B.Sc. (CBCS Pattern) Semester-I  
**USCHT01 - Chemistry Paper-I - Inorganic Chemistry**

P. Pages : 2

Time : Three Hours



**GUG/S/25/11544**

Max. Marks : 50

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1. a) Define electron affinity. Explain factors affecting on it and trends of electron affinity in a group and period. 5
- b) Define Quantum Numbers? Discuss the significance of any two types of quantum numbers in details. 5

**OR**

- c) Write Schrodinger wave equation for hydrogen atom and explain each term involved in it. 2½
- d) State and explain de-Broglie's concept of matter wave. 2½
- e) Discuss Pauling scale of electronegativity. 2½
- f) Calculate screening constant and effective nuclear charge for 35 electron of Magnesium. 2½
2. a) Define Hybridization? Explain  $sp^3$  and  $sp^3d$  hybridization with suitable example. 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 (VBT). 2½
- d) Explain the shape of  $ClF_3$  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) Atomic and Ionic Radius
- ii) Oxidation states
- b) Discuss the structure of following: 5
- i) Pyrophosphoric acid ( $H_4P_2O_7$ )
- ii) Orthophosphoric acid ( $H_3PO_4$ )

**OR**

- c) Write a note on complexation tendency of S-block elements. 2½
- d) Explain the role of alkali and alkaline earth metals in biological systems. 2½
- e) Discuss the structure of  $P_2O_5$ . 2½
- f) Discuss oxidation states of P-block elements. 2½
- 4.** a) Explain structure of: **5**
- i)  $XeF_4$  ii)  $XeOF_4$
- b) What is mean by complexometric titration? Discuss Quinonoid 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 Reaction. 2½
- 5.** Solve **any ten**. **1x10**
- a) Electronic configuration of-
- i)  $Mn (Z = 25)$  ii)  $Zn (Z = 30)$
- b) Why radius of cation is lower than that of its parent atom?
- c) State Aufbay's principle.
- d) Write two postulates of VSEPR theory.
- e) Define bond energy.
- f) Draw M.O. Diagram of Lithium Molecule.
- g) Define the term Solvation.
- h) Aluminum is good reducing agent explain.
- i) The alkali metal ions are heavily hydrated? Why?
- j) How is hydrogen bonding affect viscosity.
- k) Define Internal indicator and external indicator.
- l) Name indicator selected for titration between Weak Acid Vs Weak Base.

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