

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

P. Pages : 2

Time : Three Hours



**GUG/W/23/11544**

Max. Marks : 50

- Notes :
1. All questions are compulsory.
  2. Draw diagram wherever necessary.
  3. Use of calculator is permitted.

1. a) What is ionization potential? Explain factors affecting ionization potential. How IP follows periodic trend. 5

b) What are quantum numbers? Discuss Azimuthal and Spin quantum number in detail. 5

**OR**

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

d) Calculate effective Nuclear charge action on : = Mg (Z=12) 2½

e) What is electronegativity? Discuss the periodic trend of electronegativity in periodic table. 2½

f) Write a note on Heisenberg uncertainty principle. 2½

2. a) Draw and explain Coulson's M.O. diagram of carbon monoxide and Calculate its Bond order? 5

b) Discuss various rules of VSEPR theory and explain shape of NH<sub>3</sub> molecule on the basis of VSEPR theory. 5

**OR**

c) Explain molecular orbital diagram for O<sub>2</sub> molecule. 2½

d) Write the postulates of VBT. 2½

e) Describe the shape of SE<sub>4</sub> molecule on the basis of VSEPR theory. 2½

f) Diatomic molecule of Helium does not exists. Explain on the basis of MO theory? 2½

3. a) Discuss the p-block elements with respect to;  
i) Atomic and ionic radii 5  
ii) Reducing properties.

b) What is diagonal relationship? Explain diagonal relationship between Li and Mg. 5

**OR**

c) Write a short note on the hydrides of group VA elements. 2½

d) Discuss the complex formation tendency of alkali metals. 2½

- e) Explain the structure of orthophosphoric acid ( $\text{H}_3\text{PO}_4$ ). 2½
- f) Explain the Solvation property of S block elements. 2½
- 4. a) What is Complexometric titration? Discuss the theory of complexometric titration. 5
- b) Define volumetric titration. Explain Ostwald's theory of acid-base titration. 5

**OR**

- c) Write a note on redox indicator. 2½
- d) What is mean by hydrogen bonding. Discuss the effect of hydrogen bonding on solubility and viscosity. 2½
- e) Explain chemical property of Nobel gas. 2½
- f) Discuss the structure and bonding in  $\text{XeOF}_2$  2½
- 5. Answer the following questions **any ten**. 10
  - i) State principle quantum number.
  - ii) Write the Schrodinger wave equation.
  - iii) What is covalent radius and Van der Waal Radius?
  - iv) Define
    - i) Bond energy
    - ii) Bond length
  - v) Draw MO diagram of molecule.
  - vi) Draw geometry of  $\text{SF}_4$
  - vii) Draw structure of orthophosphoric acid
  - viii) What is  $\text{Na}^+ - \text{K}^+$  pump.
  - ix) What is action of hydrogen on Li & Ca atom?
  - x) Explain – why Noble gases are inert?
  - xi) Define intermolecular hydrogen bonding.
  - xii) Define self-indicator with example.

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