B.Sc. (Part-I) Sem-I (Old)

CHE101 - Chemistry Paper-I (Inorganic Chemistry)

P. Pages : 2 **GUG/S/19/1202**

Time : Three Hours * 0 9 0 0 * Max. Marks : 50

Notes : 1. All questions are compulsory and carry equal marks.
2. Draw diagram wherever necessary.

1. a) State and explain Hund's rule of maximum multiplicity? Apply this rule to show electronic configuration of oxygen and nitrogen. **5**

b) What is ionisation potential? Discuss any two factors affecting it. Why is first I.P for nitrogen greater than that of oxygen. **5**

OR

c) What are quantum numbers? Give the significance of principle quantum number. **2½**

d) Draw and discuss the radial probability distribution curve of 2p – orbital. **2½**

e) Define electronegativity? Explain Mulliken's scale of electronegativity. **2½**

f) What is mean by effective nuclear charge? Calculate effective nuclear charge for 3p electron in phosphorous atom. **2½**

2. a) State the postulates of VSEPR. theory on the basis of VSEPR theory explain the structure of NH_3 and ClF_3 molecule. **5**

b) Differentiate between bonding and antibonding. molecular orbitals. Draw coulson's M.O. diagram of CO molecule and calculate its bond order. **5**

OR

c) Give the conditions for the formation of molecular orbitals. **2½**

d) With the help of Mo diagram explain why Be_2 molecule does not exist. **2½**

e) What is hybridization? Explain the formation of PCl_5 molecule on the basis of hybridization. **2½**

f) Discuss the shape of CO_3^{-2} ion. **2½**

3. a) What are S-block elements? Discuss the comparative study of S-block elements with respect to: **5**
i) Ionic and atomic radii. ii) Reducing properties.

b) Discuss the structures of the following. **5**
i) Pyrophosphoric acid. ii) Phosphorous pentoxide.

OR

c) Define electron affinity. Explain why chlorine has higher electron affinity than fluorine. **2½**

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

e) What is the effect of hydrogen bonding on solubility and viscosity of compounds. **2½**

f) Discuss diagonal relationship between lithium and magnesium. **2½**

4. a) What are carbides? How are they classified? Give their any four applications. **5**

b) Give any two methods of preparation of $X_eO_2F_2$ what are interhalogen compounds? Explain the basic character of iodine. **5**

OR

c) What are polyhalides? Give its classification with examples. **2½**

d) Discuss the shape and hybridisation of X_eF_4. **2½**

e) Draw and discuss the structure of diborane. **2½**

f) What is borazole? Why is it called as inorganic benzene? Give laboratory method for its preparation. **2½**

5. Attempt **any ten.** **1x10 =10**

i) Write Schrodinger wave equation.

ii) State Heisenberg's uncertainty principle.

iii) Explain why ionic radius of K^+ ion is smaller than K.

iv) State any two limitations of VBT.

v) Draw molecular orbital diagram of B_2 molecule.

vi) What is LCAO approximation?

vii) Why s-block elements show metallic character?

viii) Draw the structure of P_2O_3 molecule.

ix) Explain why fluorine is most electronegative.

x) Write any two industrial applications of Carbides.

xi) How IF_5 is prepared from AgF?

xii) Why noble gases are chemically inert?

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