

B.Sc. (NEP) - Semester-I
BSCCH501 - (Core) Chemistry : Basic Inorganic Chemistry

P. Pages : 2

Time : Three Hours



GUG/W/24/15925

Max. Marks : 40

1. a) Explain the following – 5
- i) Heisenberg uncertainty principle.
- ii) Aufbau principle
- b) Define electronegativity. Discuss variation of electronegativity in a period and a group. 5

OR

- c) What are quantum numbers? Give the significance of spin quantum number. 2½
- d) What is an atomic orbital ? Draw the shapes of d_{xy} , $d_{x^2-y^2}$ and d_{z^2} atomic orbitals. 2½
- e) Explain the term ionization energy and discuss any three factors affecting it. 2½
- f) Define effective nuclear charge. Calculate effective nuclear charge for 3S electron of Magnesium (At No. of Mg = 12) 2½
2. a) Define 'hybridization'. Explain sp and sp^2 hybridization with suitable examples. 5
- b) Differentiate between bonding and antibonding molecular orbitals. Draw MO diagram of N_2 molecule and calculate its bond order. 5

OR

- c) Explain the shape of SF_4 molecule on the basis of VSEPR theory. 2½
- d) Give limitations of valence bond theory. 2½
- e) Explain formation of B_2 molecule on the basis of M.O. theory and comment on its magnetic behaviour. 2½
- f) How does MO theory explain monoatomic nature of helium. 2½

3. a) What are S-block elements? Discuss them with respect to : 5
i) Atomic and Ionic radii
ii) Ionization potential
- b) Explain the structure and bonding of the following: 5
i) P_2O_5
ii) Phosphoric acid

OR

- c) Discuss the diagonal relationship between Li and Mg. 2½
- d) Explain role of S-block elements in the biosystem. 2½
- e) Explain electronegativity of P-block elements. 2½
- f) Explain the decrease in bond angles of hydrides of P-block elements. 2½
4. Solve **any ten** questions. 10
- i) Write Schrodinger's wave equation.
- ii) State Hund's rule of maximum multiplicity.
- iii) Write Mulliken's mathematical expression to calculate electronegativity.
- iv) What is Screening effect?
- v) Define bond order and bond angle.
- vi) State the type of hybridization in CH_4 and PCl_5 .
- vii) Draw M.O. diagram for H_2 molecule.
- viii) Write electronic configuration of C_2 molecule on the basis of MO theory.
- ix) Draw the structure of H_3PO_3 .
- x) Why S-block elements show metallic characters?
- xi) What are P-block elements?
- xii) Define solvation.
