

B.Sc. (With Credits)-Regular-Semester 2012 Sem I
CHE101 - Chemistry: Paper-I (Inorganic Chemistry)

P. Pages : 2

Time : Three Hours



GUG/W/16/3302

Max. Marks : 50

- Notes : 1. All questions are compulsory and carry equal marks.
2. Write Equation and draw diagram wherever necessary.

1. a) What are quantum numbers? Discuss principle quantum number and azimuthal quantum number. **5**
- b) Define ionization potential. Explain the factor affecting the ionization potential and the trend of ionization potential in periodic table. **5**

OR

- c) State and explain Pauli's exclusion principle. **2½**
- d) Give the physical significance of Ψ and Ψ^2 . **2½**
- e) Define screening constant and calculate effective nuclear charge for 3S electron of Mg. (At. No. of Mg = 12). **2½**
- f) Define Electron affinity. Why Electron affinity of fluorine is less than that of chlorine. **2½**
2. a) Define hybridization. Explain SP^3d and SP^3d^2 hybridization with suitable example. **5**
- b) Discuss Coulson's molecular orbital diagram of CO molecule. **5**

OR

- c) State the postulate of valence bond theory. **2½**
- d) Explain the shape of SF_4 molecule using VSEPR theory. **2½**
- e) Distinguish between bonding and anti-bonding orbitals. **2½**
- f) Discuss the MO-diagram in H – F molecule. **2½**
3. a) Compare S-block elements with respect to **5**
1) atomic and ionic radii
2) Ionization potential.
- b) Discuss the structure of the following. **5**
i) Pyrophosphoric acid ($H_4P_2O_7$).
ii) Orthophosphoric acid (H_3PO_4).

OR

- c) Discuss diagonal relationship between Li and Mg. **2½**

- d) Discuss the function of S-block element in bio-system. 2½
- e) Compare P-block element with respect to oxidation state. 2½
- f) Discuss the structure of P₂O₅. 2½
4. a) What are boranes? Discuss the structure and bonding in diborane. 5
- b) Explain the structure of 5
- i) XeF₄ ii) XeOF₄

OR

- c) Discuss the structure and bonding in borazine. 2½
- d) Discuss the structure and bonding in IF₇. 2½
- e) What are carbides? Give four application of carbides. 2½
- f) Discuss the properties of noble gases. 2½
5. **Solve any ten.**
- 1) State Heisenberg's uncertainty principle.
 - 2) Write Electronic configuration of Cr and Zn.
 - 3) Why cation is always smaller in size than corresponding neutral atom.
 - 4) Define bond energy.
 - 5) Draw structure of NH₃ and H₃O[⊕].
 - 6) Why He₂ molecule can not form.
 - 7) Define solvation.
 - 8) Al is good reducing agent. Explain.
 - 9) Draw structure of P₂O₃.
 - 10) Write name of B₅H₁₁ and B₈H₁₄.
 - 11) Draw structure of ICl₄⁻.
 - 12) Give one method for preparation of XeO₂F₂.
