B.Sc. (CBCS Pattern) Semester-III

USCCHT05 - Chemistry Paper-I : Inorganic Chemistry

P. Pages : 2 **GUG/S/25/11600**

Time : Three Hours * 1 5 5 0 * Max. Marks : 50

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1. a) What are borazine? Discuss structure and bonding in borazine. **5**

b) Describe the preparation and structure of- **5**
i) Caro's acid ii) Marshal acid

OR

c) What are interhalogen compounds? Explain the structure and bonding in Clf_3 molecule. **2.5**

d) What are carbides? Describe the classification of carbides. **2.5**

e) What are polyhalides? Give the classification of polyhalides. **2.5**

f) Write two properties of S_4N_4 and Draw the cradle shaped sing structure of S_4N_4. **2.5**

2. a) Define Lattice energy? Describe the Born-Haber cycle used for finding the lattice energy of NaCl solid. **5**

b) What is metallic bond? Discuss the metallic properties on the basis of free electron theory. **5**

OR

c) From the given information, calculate the lattice energy of AgCl. **2.5**
Heat of formation of AgCl(s) = 127.1 kJ/mole
Heat of sublimation of Ag(s) = 284.6 kJ/mole
Ionization energy of Ag(g) = 735 kJ/mole
Dissociation energy of Cl_2 (g) = 244 kJ/mole
Electron affinity of Cl(g) = -349 kJ/mole

d) Define solvation energy? Discuss the determination of solvation energy by Born-Haber Cycle. **2.5**

e) What are semiconductors and their classifications. **2.5**

f) Explain with example of Lux-Flood concept of acid and bases. **2.5**

3. a) Discuss the first transition series with respect to electronic configuration and their atomic and ionic radius. **5**

b) Discuss the comparative study of Ni, Pd and Pt with respect to- **5**
i) Oxidation state ii) Magnetic properties.

OR

c) Write a note on oxidation states of first transition series elements. **2.5**

d) Why 3d elements have ability to behave as a catalyst. **2.5**

e) Discuss electronic configuration of second transition series elements. **2.5**

f) Explain the magnetic properties of Cr, Mo and W. **2.5**

4. a) Discuss the Lanthanide with respect to- **5**
i) Electronic configuration ii) Oxidation state

b) Discuss the Actinides with respect to- **5**
i) Atomic and Ionic radius ii) Oxidation state.

OR

c) Describe ion exchange method for separation of Lanthanides. **2.5**

d) Explain the term Lanthanide contraction in details. **2.5**

e) Write a note on position of actinide in periodic table. **2.5**

f) Discuss the complex formation tendency of Lanthanides. **2.5**

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

i) Draw the structure of diborane.

ii) Draw the structure of IF_5.

iii) What are silicates?

iv) Define space lattice.

v) Draw the band structure of Insulators.

vi) Define Lewis acids and bases.

vii) Why SC^{3+} is more stable than SC^{2+} ? Explain.

viii) Why Cu^{2+} is paramagnetic while Cu^{+} is diamagnetic, Explain.

ix) Write the electronic configuration of yttrium (z=3a) and Palladium (z=46).

x) Write any two important Minerals of Lanthanides.

xi) Define the term anomalous.

xii) $La((OH)_3$ is more basic than that of $Lu(OH)_3$ why?

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