Bachelor of Science (B.Sc.) (Part-II) (CBCS Pattern) Third Semester

USCChT05 - Chemistry-I : Paper-I (Inorganic Chemistry)

P. Pages : 2 **GUG/W/18/11600**

Time : Three Hours * 3 6 7 5 * Max. Marks : 50

Notes : 1. All **five** questions are compulsory and carry equal marks.
2. Write chemical equations and draw diagrams where necessary.

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 CIF molecule. **2½**

d) What are carbides? Describe the classification of carbides. **2½**

e) What are polyhalides? Give the classification polyhalides. **2½**

f) What are the properties of tetra Sulphur tetra nitride (S_4N_4)? Draw the cradle shaped ring structure of S_4N_4. **2½**

2. a) Define lattice energy. How will you calculate lattice energy of ionic solid by Born-Haber cycle. **5**

b) What is metallic bond? Explain free electron theory for metals. **5**

OR

c) Define the term "Solvation energy". What are the factors affecting solvation energy? **2½**

d) What is polarization of ions? Discuss Fajan's Rule with example. **2½**

e) Define acids and bases in terms of Lux-Flood concept. Give one example of each. **2½**

f) Discuss band theory for conductors. **2½**

3. a) Discuss first transition series with respect to their electronic configuration and Ionization potential. **5**

b) Compare the following. **5**
i) Cr, Mo, & W --------- with respect to oxidation state.

ii) Ni, Pd & Pt ---------- with respect to stereochemistry.

OR

c) Discuss elements of first transition series with respect to complex formation tendency. **2½**

d) Compare magnetic properties of Co-Rh-Ir group. **2½**

e) Explain variable oxidation state of first transition series elements. **2½**

f) Discuss Fe, Ru and Os with respect to oxidation states. **2½**

4. a) What do you mean by lanthanide contraction? Give reasons of lanthanide contraction. How it affects properties of post lanthanide elements? **5**

b) Discuss actinides with respect to – **5**
i) Electronic configuration. ii) Oxidation states.

OR

c) Discuss lanthanides with respect to their complex formation tendency. **2½**

d) What are actinides? What do you mean by actinide contraction? **2½**

e) What are lanthanides? Show the position of lanthanides in periodic table. **2½**

f) Discuss ion exchange method for separation of lanthanides. **2½**

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

i) Draw the structure of diborane.

ii) Why borazine is called inorganic benzene?

iii) Draw the band structure of semiconductors.

iv) What are silicates?

v) Define coordination number.

vi) Give two advantages of Lewis concept.

vii) Why Cu^{+2} coloured and paramagnetic?

viii) Write the electronic configuration of Ni & Pd.

ix) Define – Complex.

x) Name any two important minerals of lanthanides.

xi) What do mean by transuranium elements.

xii) Why Zn and Hf are called twins elements?

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