

Bachelor of Science (B.Sc.) (Part-II) (CBCS Pattern) Third Semester  
**USCChT05 - Chemistry-I : Paper-I (Inorganic Chemistry)**

P. Pages : 2

Time : Three Hours



**GUG/W/18/11600**

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  $\text{Cu}^{+2}$  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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