Reg. No. | | | | | | | | | |

ICH 401

First Semester M.Sc. Examination, December 2018
INDUSTRIAL CHEMISTRY
Inorganic Chemistry

Time : 3 Hours Max. Marks : 70

Notes : 1) *Answer* ***any five*** *questions in Part – **A** and* ***any five*** *questions from Part – **B**.*
2) *Figures to the* ***right*** *indicate marks.*

PART – A (5×2=10)

1. a) What are cryptands ? How is it different from crown ethers ?
   b) What are pseudohalogens ? Give two examples.
   c) What is hydrometallurgy ?
   d) What are the important significances of Latimer diagram?
   e) Define 18 electron rule and discuss its validity with one example.
   f) What are nitrosyls ? Show its bonding pattern with any one metal.
   g) Write standard reduction formula and explain the terms.
   h) What are point groups? Find the point group of Chloroform molecule.

PART – B (5×12=60)

2. a) What are zeolites ? Mention any two applications.
   b) Write on alkali and alkaline earth metal complexes of crown ethers, cryptands and calixarenes and their biological significance. (6+6)

3. a) Describe the theory of pyrometallurgy and explain how it is used for the extraction of Titanium metal.
   b) Write a note on the significance of Ellingham diagram in metallurgy. (6+6)

4. a) Explain the structure and bonding in Ferrocene. Write also the point group of staggered and eclipsed ferrocene.
   b) Write any two synthetic strategies of transition metal alkyls and aryls. (6+6)

P.T.O.

5. a) Illustrate symmetry considerations to determine IR and Raman active modes of vibration.

   b) Describe Great Orthogonality Theorem. (6+6)

6. a) What are interhalogen compounds? Give examples and discuss any two methods for their preparation.

   b) Discuss the structure, properties and applications of Graphite. (6+6)

7. a) What are Frost diagrams ? What is its use ?

   b) Explain the methods of preparation, structure and bonding in metal carbonyls. (6+6)

8. a) Discuss the methods of preparation, structure and bonding in metal alkyls and aryls with specific examples.

   b) What are the important applications of metal alkene and metal arene complexes ? (6+6)

9. a) Obtain the symmetry operations of methyl chloride. Construct the multiplication table for these operations and find the sub group and class.

   b) Construct the character table of C_{3v} point group and reduce the following representation using the character table mentioned above. (6+6)

C_{3V}	E	$2C_3$	$3\sigma_v$
T	5	2	−1