

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. (6+6)
- b) Describe Great Orthogonality Theorem. (6+6)
6. a) What are interhalogen compounds? Give examples and discuss any two methods for their preparation. (6+6)
- 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