

**M.Sc. I Semester Degree Examination, April/May - 2024****INDUSTRIAL CHEMISTRY****DSC-1 : Concepts in Inorganic Chemistry****(NEP)**

Time : 3 Hours

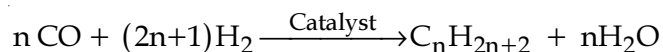
Maximum Marks : 70

Note : (i) Answer **any five** questions including Q. No. 1.(ii) Q. No. 1 is **Compulsory**.

1. (a) Predict the shapes of the following species based on VSEPR : ClF_3 , TeCl_6^{2-} , I_3^- and XeF_8^{2-} . **4+3+3+4=14**
(b) Write a note on Born-Landé equation.
(c) State Fajan's rules. Explain with examples.
(d) Explain the LCAO approach on σ , π and δ molecular orbitals.
2. (a) Explain the Band theory of solids. **5+5+4=14**
(b) What are semiconductors ? Explain the types of semiconductors with examples.
(c) Discuss about Frenkel and Schottky defects.
3. (a) What is HSAB concept ? Explain with suitable examples. **5+5+4=14**
(b) What are non-aqueous solvents ? Why are they required ? Explain the applications of liquid sulphur dioxide as a non-aqueous solvent.
(c) Write a note on Irving-William series.
4. (a) Discuss the synthesis and stability of Metal alkyls. **5+5+4=14**
(b) Give methods of synthesis of alkyl lithiums. Discuss their structure and bonding with examples.
(c) Discuss the synthesis and structure of ferrocene. Give any two chemical properties of ferrocene which show its aromatic character.
5. (a) Comment on migratory insertion reactions. How are they classified ? Give suitable examples. **5+5+4=14**
(b) What is Oxo process ? Discuss the steps involved in the catalytic mechanism of Oxo process.
(c) Write a note on anchored of catalysts with an example.



6. (a) What are conductors, semiconductors and insulators ? Explain mechanism of their conductivity through their energy bands. **5+5+4=14**
(b) Account for the chemical reactions of solids.
(c) What is levelling effect ? Explain with examples.
7. (a) What are Super acids and Molten salts ? Give examples for both. **5+5+4=14**
(b) Discuss the synthesis of metal olefins. Explain the structure and bonding in metal olefins taking Zeise's salt as an example.
(c) What is 18 electron rule ? Explain the methods of counting the electrons in the organometallic system.
8. (a) What is Ziegler-Natta catalyst ? Write a note on obtaining isotactic and syndiotactic polypropylene. **5+5+4=14**
(b) Explain fluxional behaviour of organometallic complexes. Explain the identification methods of fluxional isomerism.
(c) Discuss the mechanism of the following reaction :



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