TM253224W

Reg. No :.....

Name :.....

MASTER'S DEGREE (C.S.S) EXAMINATION, OCTOBER 2025

2024 ADMISSIONS REGULAR

SEMESTER III - CORE COURSE CHEMISTRY

CH3C09TM20 - Structural Inorganic Chemistry

Time : 3 Hours

Maximum Weight : 30

Part A

I. Answer any Eight questions. Each question carries 1 weight (8x1=8)

1. Describe vacancy diffusion.
2. Discuss the thermal decomposition of metal carbonates.
3. Discuss on the application of Meissner effect in superconductors.
4. Discuss the merits of Quantum free electron theory.
5. Phosphate esters play an important role in biological system. Justify.
6. Explain infinite metal chains with suitable examples.
7. Classify polymers with organometallic moieties in the main chain. Give one example for each.
8. Outline the preparation of a) Polyferrocenylene b) Polyferrocenylamide
9. Explain the hydrothermal synthesis of solids.
10. Explain the process nucleation in solid synthesis.

Part B

II. Answer any Six questions. Each question carries 2 weight (6x2=12)

11. Sketch and explain Rutile structure and give examples.
12. Explain lattice imperfections in solids.
13. Explain hall effect and derive an equation for an electron in an electric field.
14. Explain Pyroelectricity with an example.
15. Give the styx number for following compounds (a) B_3H_9 (b) B_5H_{11} and (c) B_6H_{10}.
16. Summarize the different applications of C_2B_{10} for Drug Design.
17. Explain alkynyl ligand exchange and ammine free synthesis for the preparation of organometallic polymers based on rigid rod polyynes.
18. Discuss any two methods for the preparation of organometallic polymers based on ring opening polymerization reactions.

Part C

III. Answer any Two questions. Each question carries 5 weight (2x5=10)

19. (a) Explain briefly the different methods used in crystal growth from Melt and Vapour deposition technique (b) Summarize the different factors that influences the solid state reactions.
20. (a) Discuss the postulates, merits and demerits of classical free electron theory. (b) Discuss on BCS theory of super conductivity.
21. Discuss the heterocyclic inorganic ring system of phosphorus-sulphur and sulphur-nitrogen compounds with suitable examples.
22. Explain (a) Intercalation and deintercalation in the synthesis of solids. (b) Synthesis of amorphous silica and diamond films.